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Region 2 RAC2 Remedial Action Contract

Data Evaluation Report

Pierson's Creek Site, Operable Unit 2

Remedial Investigation/ Feasibility
Study Oversight

Newark, New Jersey

June 3, 2019

**CDM
Smith**

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Acronyms

ABS	absolute difference
CDM Smith	CDM Federal Programs Corporation
CLP	Contract Laboratory Program
CRQL	contract required quantitation limit
DQI	data quality indicator
DQO	data quality objective
DMC	deuterated monitoring compound
DV	data validation
EPA	United States Environmental Protection Agency
FS	Feasibility Study
Hg	mercury
GC/MS	gas chromatography/mass spectrometry
ICP-AES	inductively coupled plasma-atom emission spectroscopy
ICP-MS	inductively coupled plasma-mass spectrometry
ID	identification
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MS	matrix spike
MSD	matrix spike duplicate
mg/kg	milligram per kilogram
mg/L	milligram per liter
N	normal
NA	not applicable
NC	not calculable
ng/mL	nanogram per milliliter
OU	operable unit
PAL	project action limit
% D	percent difference
% R	percent recovery
% RSD	percent relative standard deviation
PRP	potentially responsible party
PPW	Paired Prentice Wilcoxon
QA	quality assurance
QC	quality control
QAPP	quality assurance project plan
QL	quantitation limit
rev.	revision
RI	remedial investigation
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
SO	soil
SOP	standard operating procedure
SOW	statement of work
SM	standard method

SVOC	semivolatile organic compound
TAL	Target Analyte List
TB	trip blank
TCL	Target Compound List
the Site	Pierson's Creek Site
VOC	volatile organic compound
WG	groundwater
WQ	water quality
µg/L	microgram per liter

Section 1

Introduction

CDM Federal Programs Corporation (CDM Smith) performed oversight of potentially responsible party (PRP) field activities for the Remedial Investigation (RI) / Feasibility Study (FS) at the Pierson's Creek Site (the Site), Operable Unit 2, located in Newark, New Jersey. The overall objective of the field oversight activities was to verify the quality of the PRP's data and ensure that work is performed in compliance with approved plans. This included verification that all field activities were performed in accordance with the PRP's final quality assurance project plan (QAPP) and acceptance and analysis of split samples for comparison with the PRP's data. This report compares CDM Smith's split sample results to the PRP sample results and discusses the differences in the data pairs. In this document, samples are referred to as either PRP samples or CDM Smith split samples for clarity. This report also discusses usability of split samples data accepted by CDM Smith and documents whether those data meet quality objectives and user requirements outlined in the Pierson's Creek Site Final QAPP (CDM Smith 2018).

Sampling activities occurred from December 4, 2018 through December 27, 2018 and February 9, 2019. CDM Smith accepted split samples from soil and groundwater sampling activities at a rate of approximately 10 percent of the PRP's samples by matrix. The split samples were subsequently submitted to the Environmental Protection Agency (EPA) Contract Laboratory Program (CLP) laboratory for analysis. Samples accepted and methods used to analyze the samples are summarized in Table 1-1.

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Section 2

Usability Summary

Split sample data generated during the RI/FS oversight are considered definitive data generated under an EPA approved QAPP, following EPA methods and validated according to EPA Region 2 Guidelines. Data were validated by EPA data validation contractors.

The Data Usability Worksheet discusses field sampling and validation process and summarizes the achievement of the data quality objectives (Table 2-1). Only the final qualified data will be presented in the reports pertaining to the Site. The split sample data that did not meet quality control (QC) criteria were appropriately qualified as estimated (J, J+, J-, JN, or NJ), estimated non-detect (U or UJ), or as rejected (R) during data validation. All data reported herein are usable with the following data validation qualifiers added.

- J: The analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample.
- J+: The result is an estimated quantity, but the result may be biased high.
- J-: The result is an estimated quantity, but the result may be biased low.
- JN or NJ: The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- R: The sample results are unusable due to poor data quality; certain criteria were not met. The analyte may or may not be present in the sample at the reported concentration.
- U: The analyte was not detected at a level greater than or equal to the level of the sample contract required quantitation limit (CRQL).
- UJ: The analyte was not detected; however, the reported CRQL is approximate and may be inaccurate or imprecise.

Less than one percent (%) of CDM Smith's semivolatile organic compound (SVOC) results were rejected due to surrogate recovery. Two samples, GS-B-112-001-CDM and GS-B-114-001-CDM, had 1,4-dioxane results rejected. Completeness Tables 2-2a and 2-2b show data qualified for environmental samples accepted during the RI/FS oversight split sampling events. Final percentages of valid data are 99.85 % for soil and 100 % for groundwater. Thus, the 90 percent completeness goal for usable data has been met. Table 2-3 presents trip blank results.

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Section 3

Data Quality Indicators

Precision, accuracy, representativeness, comparability, completeness, and sensitivity are used as data quality indicators (DQIs). These DQIs provide a mechanism for evaluating and measuring data quality throughout the project. Achievement of the project's quality objectives was measured from the DQI results assessed against their measurement performance criteria described in Worksheets 12 and 28 of the Final QAPP (CDM Smith 2018). QC parameters evaluated in data review/data validation and corresponding DQIs are discussed in Table 2-1.

As part of the oversight assignment, CDM Smith was tasked to accept split samples for 10 percent of the PRP's soil and groundwater samples; and compare split sample results with the PRP data. A relative percent difference (RPD) was calculated when both CDM Smith split and PRP samples results were greater than five times EPA's CRQL. When either of the results were equal to or less than five times EPA's CRQL, an absolute difference (ABS) was calculated. When both results were not detected, neither RPD nor ABS were calculated.

CDM Smith split samples and PRP samples were evaluated using a criterion of 100 percent RPD for soil samples and 50 percent RPD for groundwater samples. For all other data sets, the ABS should be less than two times EPA's CRQL. The comparison results are provided in Tables 3-1a and 3-1b for soil samples and Table 3-2 for groundwater samples. RPD/ABS exceedances are summarized in Table 2-1; chemicals with RPD/ABS exceedances are summarized below.

- Soil samples:
 - Metals: antimony, arsenic, silver, sodium, thallium, vanadium, and zinc
 - PCBs: Aroclor 1242, Aroclor 1254, and Aroclor 1260
 - SVOCs: 1,1-biphenyl, 1,2,4,5-tetrachlorobenzene, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, carbazole, chrysene, dibenzo(a,h)anthracene, dibenzofuran, dimethylphthalate, di-n-butylphthalate, di-n-octylphthalate, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, phenol, and pyrene
 - VOCs: 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, 2-butanone, acetone, benzene, carbon disulfide, chlorobenzene, cis-1,2-dichloroethene, cyclohexane, ethylbenzene, isopropylbenzene, m,p-xylene, methyl acetate, methylcyclohexane, methylene chloride, o-xylene, tetrachloroethene, toluene, and trichloroethene
- Groundwater samples:
 - Metals: aluminum, arsenic, iron, lead, mercury, and zinc
 - Pesticides: delta-BHC
 - VOCs: 1,2-dichlorobenzene, cyclohexane, m,p-xylene, methylcyclohexane, and methylene chloride

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Section 4

Data Comparison

Chemicals with RPD/ABS exceedance were further evaluated using a Paired Prentice Wilcoxon (PPW) test. These selected analytes were evaluated only when there were at least four detected sample pairs. The statistical tests were performed to calculate p-values. The p-value indicates whether the difference between the data pairs is statistically significant. A p-value of less than 0.05 indicates a statistically significant difference between the two datasets. PPW tests were conducted to allow inclusion of the left-censored (nondetected) data pairs for selected analytes. The elimination of data pairs containing nondetected values is essentially equivalent to ignoring potentially substantial information contained within these nondetect-containing data pairs and may have led to biased results (Helsel 2005).

4.1 Soil Samples

PPW tests results for soil sample pairs are presented in Table 4-1. Most results were comparable, except the following chemicals:

- Metals: antimony and silver
- PCBs: Aroclor 1254
- SVOCs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, and indeno(1,2,3-cd)pyrene
- VOCs: o-xylene

The difference in results between PRP and CDM Smith split data pairs was consistent; PRP sample concentrations were generally higher than CDM Smith sample concentrations.

4.2 Groundwater Samples

Only two groundwater split samples were accepted. Thus, PPW tests were not performed on groundwater samples with RPD/ABS exceedances. The difference in results between PRP and CDM Smith data pairs was consistent. PRP sample concentrations were consistently less than CDM Smith sample concentrations for metal and VOCs results. Pesticides (delta-BHC) were only detected in one PRP sample.

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Section 5

References

PRP Documents

Geosyntec Consultants. 2018. Quality Assurance Project Plan, Appendix 1 – Remedial Action Work Plan, Operable Unit 2, Pierson’s Creek Superfund Site. Troy Chemical Newark Manufacturing Plan. Newark, New Jersey. March.

CDM Smith Documents

CDM Federal Programs Corporation (CDM Smith). 2018. Final Quality Assurance Project Plan. Pierson’s Creek Site, Newark, New Jersey. July 30.

Data Validation Procedures (EPA Region 2 Protocols)

Environmental Protection Agency. 2016. Hazardous Waste Support Section, Standard Operating Procedures (SOP) No. HW-33A. Low/Medium Volatile Data Validation. Revision 1. September.

_____. 2015. HW-34A. Trace Volatile Data Validation. Revision 1. June.

_____. 2016. Hazardous Waste Support Section, SOP No. HW-35A. Semivolatile Data Validation. Revision 1. September.

_____. 2016. Hazardous Waste Support Section, SOP No. HW-36A. Pesticides Data Validation. Revision 1. October.

_____. 2015. Hazardous Waste Support Section, SOP No. HW-37A. Polychlorinated Biphenyl (PCB) Aroclor Data Validation. Revision 0. June.

_____. 2015. Hazardous Waste Support Section, SOP No. HW-3A. Inductively coupled plasma-atom emission spectroscopy (ICP-AES) Data Validation. Revision 1. July.

_____. 2016. Hazardous Waste Support Section, SOP No. HW-3B. Inductively coupled plasma-mass spectroscopy (ICP-MS) Data Validation. Revision 1. September.

_____. 2015. Hazardous Waste Support Section, SOP No. HW-3C. Mercury and Cyanide Data Validation. Revision 1. July.

Analytical Methodologies

EPA. 2016. EPA Contract Laboratory Program, Statement of Work for Organic Superfund Methods, Multi-media, Multi-Concentration. SOM02.4. October.

EPA. 2016. EPA Contract Laboratory Program, Statement of Work for Inorganic Superfund Methods, Multi-media, Multi-Concentration. ISM02.4. October.

Data Comparison

Helsel. D.R. 2005. Nondetects and Data Analysis: Statistics for Censored Environmental Data. Wiley-Interscience.

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Tables

Tables

Table 1-1
Summary of Split Samples
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Location	Sample ID	PRP's Sample ID	Medium	Sample Type	Sample Date	Mercury	Metals	PCBs	Pesticides	SVOCs	VOCs
GS-B-101	GS-B-101-001-CDM	GS-B-101-001-GEOSY	SO	N	12/14/2018	1	22	9		68	
GS-B-101	GS-B-101-004-CDM	GS-B-101-004-GEOSY	SO	N	12/14/2018						51
GS-B-102	GS-B-102-001-CDM	GS-B-102-001-GEOSY	SO	N	12/17/2018	1	22	9		68	
GS-B-102	GS-B-102-002-CDM	GS-B-102-002-GEOSY	SO	N	12/17/2018	1	22	9		68	
GS-B-102	GS-B-102-004-CDM	GS-B-102-004-GEOSY	SO	N	12/17/2018						51
GS-B-106	GS-B-106-004-CDM	GS-B-106-004-GEOSY	SO	N	12/13/2018						51
GS-B-111	GS-B-111-001-CDM	GS-B-111-001-GEOSY	SO	N	12/17/2018	1	22	9		68	
GS-B-111	GS-B-111-004-CDM	GS-B-111-004-GEOSY	SO	N	12/17/2018						51
GS-B-112	GS-B-112-001-CDM	GS-B-112-001-GEOSY	SO	N	12/13/2018	1	22	9		68	
GS-B-112	GS-B-112-004-CDM	GS-B-112-004-GEOSY	SO	N	12/13/2018						51
GS-B-114	GS-B-114-001-CDM	GS-B-114-001-GEOSY	SO	N	2/9/2019	1	22	9		68	51
GS-SS-101	GS-SS-101-001-CDM	GS-SS-101-001-GEOSY	SO	N	12/4/2018	1	22	9		68	
GS-SS-101	GS-SS-101-002-CDM	GS-SS-101-002-GEOSY	SO	N	12/4/2018	1	22	9		68	
GS-SS-101	GS-SS-101-003-CDM	GS-SS-101-003-GEOSY	SO	N	12/4/2018						51
GS-SS-111	GS-SS-111-001-CDM	GS-SS-111-001-GEOSY	SO	N	12/4/2018	1	22	9		68	
GS-SS-111	GS-SS-111-003-CDM	GS-SS-111-003-GEOSY	SO	N	12/4/2018						51
MW-10	MW-10-CDM	MW-10-GEOSY	WG	N	12/20/2018	1	22	9	21	68	51
MW-17	MW-17-CDM	MW-17-GEOSY	WG	N	12/27/2018	1	22	9	21	68	51
	TB-122718		WQ	TB	12/27/2018						51

Notes:

1. Numbers in the table represent the number of compounds reported in each CDM Smith analytical group.

Abbreviations:

ID = identification	SVOC = semivolatile organic compound
N = normal	TB = trip blank
PCB = polychlorinated biphenyl	VOC = volatile organic compound
SO = soil	WG = groundwater
SOP = standard operating procedure	WQ = water quality

<u>Parameter</u>	<u>Method*</u>	<u>Parameter</u>	<u>Method*</u>
Mercury	ISM02.4	Pesticides	SOM02.4
Metals	ISM02.4	SVOC	SOM02.4
PCBs	SOM02.4	VOC	SOM02.4

*The methods listed are those included in the electronic data deliverables from the laboratories and are based on SOPs consistent with the quality assurance project plan requested methods.

Table 2-1
Data Usability Worksheet
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Data Quality Indicators (DQIs) and Corresponding Quality Control (QC) Parameters	
Data Quality Indicators	QC Parameters Evaluated in Data Review/Validation
Precision	Relative percent difference (RPD) or percent difference (% D) values of: Initial calibration and continuing calibration verifications Laboratory control sample (LCS)/LCS duplicates Matrix spike/matrix spike duplicate (MS/MSD) ICP inter-element interference check samples Serial dilutions (Inductively Coupled Plasma [ICP] metals)
Accuracy/Bias	Percent Recovery (% R) values of: Initial calibration and continuing calibration verifications LCS/LCSDs MS/MSDs Surrogate spikes Deuterated monitoring compounds (DMC) Laboratory control samples (LCS) Post digestion spikes Results of: Instrument and calibration blanks Method (preparation) blanks Trip blanks
Representativeness	Results of all blanks Sample integrity (Chain-of Custody and sample receipt forms) Holding times Adequacy of sample dilutions Method blanks
Comparability	Sample-specific reporting limits (RLs) Sample collection methods Laboratory analytical methods Split samples
Completeness	Data qualifiers Laboratory deliverables Requested/reported results Field sample collection (primary and QC samples) Contract compliance (i.e., method and instrument QC within limits)
Sensitivity	Sample RLs Project action limits (PALs) Project quantitation limit goals

Table 2-1
Data Usability Worksheet
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Activity	Comment
Field Sampling	
Discuss sampling problems and field conditions that affect data usability.	No Field Change Notifications to the Final Quality Assurance Plan (QAPP) (July 2018) were required.
Are samples representative of receptor exposure for this medium (e.g. sample depth, grab versus composite, filtered versus unfiltered, low flow, etc.)?	Samples were kept at 0 to 6 degrees Celsius and were received intact at the laboratories. In addition, the split sampling design was developed to determine accuracy of the potentially responsible party (PRP)'s investigation results.
Assess the effect of field QC results on data usability.	CDM Smith did not accept equipment blank split samples during the event – they are not typically required for oversight assignments. Trip Blanks – Acetone was detected in a trip blank just above the contract required quantitation limit (CRQL) (Table 2-3). The trip blank detection required no sample qualifications.
Summarize the effect of field sampling issues on the data assessment, if applicable.	None.
Analytical Techniques	
Were the analytical methods appropriate for quantitative data assessment?	Yes. Analytical methods used for the soil and groundwater samples were appropriate for oversight evaluation. Volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, and polychlorinated biphenyls (PCBs) were analyzed by United States Environmental Protection Agency (EPA) method SOM02.4. EPA analyzed metals and mercury by method ISM02.4. A list of analyses is included on Table 1-1, Summary of Split Samples.
Were detection limits adequate?	Except for diluted results, sample reporting limits are at the CRQLs which facilitates comparison of the data with the QAPP PALs. Organic and inorganic samples diluted were due to high concentrations. This did not impact the quality of the comparison since generally the PRP results were higher due to dilution as well.

Table 2-1
Data Usability Worksheet
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Activity	Comment
Analytical Techniques (Continued)	
Summarize the effect of analytical technique issues on the data assessment, if applicable.	<p>Internal Standards - Internal standards performance criteria ensure that gas chromatography (GC)/ mass spectrometry (MS) sensitivity and response are stable during every analytical run.</p> <p>VOCs internal standards results outside criteria are estimated.</p> <p>Compound Identification - The retention times of reported compounds must fall within the calculated retention time windows for two chromatographic columns and a GC/MS confirmation is required if PCB concentration exceeds 10 nanograms per milliliter (ng/mL) in the final sample extract. Several PCB Aroclors results are estimated.</p> <p>Analytical Blank - Laboratory method blank detections resulted in qualification of VOCs and metals; associated sample results are qualified as non-detect at the CRQL.</p> <p>Other Problems - Several sample results did not meet criteria for other QC problems identified in the data validation (DV) reports - VOC sample results are qualified as estimated. One VOC result is qualified "J" as the reported value is over the calibration range. The dilution analysis was not performed for this VOC sample (GS-B-101-004-CDM).</p>
Reconciliation of Data Quality Objectives	
Precision - How were duplicates handled?	<p>Since CDM Smith accepted split samples from the PRP, field duplicate samples were not required.</p> <p>MS/MSD – Several PCB Aroclors and one pesticide MS/MSD do not meet QC criteria. Affected sample results are qualified as estimated.</p> <p>Inductively Coupled Plasma (ICP) Serial Dilution (Inorganics) - Several ICP serial dilutions do not yield acceptable % D. Associated metal results are estimated.</p>
Accuracy - How were split samples handled?	<p>As part of the oversight assignment, CDM Smith was tasked to accept split samples for 10 percent of the PRP samples by matrix and compare the split sample results with the PRP data. The split samples were subsequently submitted to the Contract Laboratory Program (CLP) laboratory for analyses.</p> <p>CDM Smith accepted soil and groundwater split samples at a rate of 10 percent from the PRP contractor. Split and PRP samples were compared, and results are shown on Table 3s.</p> <p>Splits and PRP soil samples were evaluated using a criterion of 100 percent RPD applied when both results were greater than five times the EPA's CRQL. For all other data sets, the absolute difference (ABS) should be equal to or less than two times the EPA's CRQL.</p>

Table 2-1
Data Usability Worksheet
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Activity	Comment
Reconciliation of Data Quality Objectives (Continued)	
Accuracy - How were split samples handled? - Continued	<p>Splits and PRP groundwater samples were evaluated using a criterion of 50 percent RPD applied when both results were greater than five times the EPA's CRQL. For all other data sets the ABS should be equal to or less than two times the EPA's CRQL.</p> <p>Soil - Target Analyte List (TAL) metals, including mercury, Target Compound List (TCL) PCBs, TCL SVOCs, and TCL VOCs.</p> <p>The outliers below failed the applicable RPD or ABS criteria:</p> <ul style="list-style-type: none"> ■ TAL Metals and Hg – RPD/ABS results for 15 analytes exceeded out of 202 calculable pairs ■ TCL PCBs- RPD/ABS results for six analytes exceeded out of 23 calculable pairs ■ TCL SVOC- RPD/ABS results for 67 analytes exceeded out of 186 calculable pairs ■ TCL VOC- RPD/ABS results for 46 analytes exceeded out of 89 calculable pairs <p>As shown on Tables 3-1a and 3-1b, most of the soil split results met criteria. Refer to Section 4 of the text for additional data comparison discussion.</p> <p>Groundwater - TAL metals, including mercury, TCL PCBs, TCL pesticides, TCL SVOCs, and TCL VOCs</p> <p>The outliers below failed the applicable RPD or ABS criteria:</p> <ul style="list-style-type: none"> ■ TAL Metals and Hg – RPD/ABS results for eight analytes exceeded out of 37 calculable pairs ■ TCL Pesticide – ABS result for one analyte exceeded out of one calculable pair ■ TCL VOC – RPD/ABS results for five analytes exceeded out of 29 calculable pairs <p>As shown on Table 3-2, most of the groundwater split results met criteria. Refer to Section 4 of the text for additional data comparison discussion.</p> <p>DMCs and Surrogate Recoveries – Several DMCs and surrogates exceeded QC criteria. This affected sample results for some VOC, SVOCs, and PCB which are estimated. SVOC 1,4-dioxane was rejected in two samples (GS-B-112-001-CDM and GS-B-114-001-CDM) due to surrogate recoveries.</p>

Table 2-1
Data Usability Worksheet
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Activity	Comment
Reconciliation of Data Quality Objectives (Continued)	
Accuracy - How were split samples handled? - Continued	<p>Percent Relative Standard Deviation (% RSD) and Percent Difference (% D) - Percent RSD is calculated from the initial calibration and used to indicate stability of the specific compound response factor over increasing concentration. % D compares the response factor of the continuing calibration check to the mean relative response factor (RRF) from the initial calibration. % D is a measure of the instrument's daily performance. A value outside of these limits indicates potential detection and quantitation errors. % RSD and % D recoveries outside control limits for some VOC and SVOCs were estimated by the data validator.</p> <p>Matrix Spike – Several MS or MS/MSD sample results do not meet QC criteria. Associated PCBs, pesticides, metals and mercury sample results are qualified as estimated.</p>
Representativeness - Indicate any problems associated with data representativeness (e.g., trip blank or rinsate blank contamination, chain of custody problems, etc.).	<p>As specified in the QAPP, no equipment blanks were collected during this split sampling event.</p> <p>Trip Blanks – Acetone was detected above the CRQL in the trip blank, but this chemical is not a contaminant of concern (Table 2-3). No validation actions were required; therefore, the data validator did not qualify sample results.</p>
Completeness - Indicate any problems associated with data completeness (e.g., incorrect sample analysis, incomplete sample records, problems with field procedures, etc.).	<p>Completeness of the data set achieved by CDM Smith is presented in Table 2-2s which only includes environmental samples, not QC samples. The list of collected samples and analytical parameters are shown on Table 1-1. For data collected and judged to be valid, refer to Tables 2-2a and 2-2b:</p> <ul style="list-style-type: none"> ▪ Soil results were 99.85 percent complete ▪ Groundwater results were 100 percent complete <p>The overall goal was to generate a complete data set for at least 90 percent of the samples planned for collection and 90 percent valid data from the samples analyzed. Therefore, CDM Smith achieved the data completeness goal in the Final QAPP.</p> <p>The data validation narratives indicate that analyses generally met method QC criteria.</p> <p>One hundred percent of planned TCL/TAL parameter split samples were accepted. The data set is complete based on the 10 percent of planned split samples acceptance goal. During the field event, the PRPs added dissolved metals and mercury analyses. CDM Smith did not accept samples for these parameters since these were not scoped. Per EPA's direction, extractable petroleum hydrocarbons were not collected since the CLP laboratory would not analyze the samples.</p>

Table 2-1
Data Usability Worksheet
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Activity	Comment
Data Validation and Interpretation	
Comparability - Indicate any problems associated with data comparability.	In general, the PRP and CDM Smith split data sets are comparable for VOCs, SVOCs, pesticides, PCBs, and metals including mercury. Refer to Section 4 of the text for additional data comparison discussion.
Were the DQOs specified in the QAPP satisfied?	Yes, the data quality objectives (DQOs) identified in the QAPP were satisfied.
Summarize the effect of DQO issues on the data assessment, if applicable.	There are no DQO issues that affect data usability.
What are the data validation requirements?	Page 1 shows the DQIs and Corresponding QC Parameters and the specific topics covered by the data validation review. 100 percent of the data were validated.
What method or guidance was used to validate the data?	The data validation criteria in the QAPP were applied: Standard operating procedures (SOPs) HW-33A revision (rev.) 1; HW-34A rev. 1; HW-35A rev. 1; HW-36A rev. 1; HW-37A, rev. 0; HW-3A rev. 1; HW-3B rev 1.; HW-3C rev. 1
Was the data validation method consistent with guidance? Discuss any discrepancies.	Yes. The data validation method was consistent with regional guidance.
Were all data qualifiers defined? Discuss those which were not.	Yes. All data qualifiers were defined.
Which qualifiers represent useable data?	J, J+, J-, NJ or JN, U, and UJ
Which qualifiers represent unusable data?	R
How are tentatively identified compounds handled?	These data were not evaluated under this study.

Table 2-1
Data Usability Worksheet
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Activity	Comment
Data Validation and Interpretation (Continued)	
Summarize the effect of data validation and interpretation issues on the data assessment, if applicable.	Data qualified with an "R" will not be used.
Additional notes:	None.

Note: This Worksheet summarizes the data usability analysis and conclusions. Refer to specific pages in the oversight split comparison report for more details on the information presented here.

Table 2-2a
CDM Smith Soil Completeness
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Analytical Parameter	Non-Detects	No. of Hits	No. of Rejects	No. of Estimated Hits	Total	Percent Rejected	Percent Estimated Hits
VOCs	341	31	0	36	408	0.00	8.82
SVOCs	470	63	2	77	612	0.33	12.58
PCBs	67	8	0	6	81	0.00	7.41
Metals	17	158	0	23	198	0.00	11.62
Mercury	0	8	0	1	9	0.00	11.11
Sum	895	268	2	143	1308	0.15	10.93

Percent of all Data Rejected	0.15	
Percent of all SVOC Rejected	0.33	
Percent of all Hits Estimated	10.93	(does not include estimated non-detect data)
Percent Complete (judged valid)	99.85	(Includes all estimated data)

Notes:

The counts and calculations above include only environmental samples; field duplicate, field blank, and trip blanks are not included.

PCB = polychlorinated biphenyl

SVOC = semivolatile organic compound

VOC = volatile organic compound

Table 2-2b
CDM Smith Groundwater Completeness
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Analytical Parameter	Non-Detects	No. of Hits	No. of Rejects	No. of Estimated Hits	Total	Percent Rejected	Percent Estimated Hits
VOCs	76	18	0	8	102	0.00	7.84
SVOCs	134	1	0	1	136	0.00	0.74
Pesticides	42	0	0	0	42	0.00	0.00
PCBs	18	0	0	0	18	0.00	0.00
Metals	12	27	0	5	44	0.00	11.36
Mercury	1	1	0	0	2	0.00	0.00
Sum	283	47	0	14	344	0.00	4.07

Percent of all Data Rejected	0.00	(does not include estimated non-detect data) (Includes all estimated data)
Percent of all Hits Estimated	4.07	
Percent Complete (judged valid)	100	

Notes:

The counts and calculations above include only environmental samples; field duplicate, field blank, and trip blanks are not included.

PCB = polychlorinated biphenyl

SVOC = semivolatile organic compound

VOC = volatile organic compound

Table 2-3
Trip Blank Results
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	CRQL	Unit	TB-122718	
			12/27/2018	
VOCs				
Acetone	5	µg/L	6	

Notes:

1. Samples and compounds with no detects are not included in the table above.
2. Hits at or above the CRQL are highlighted yellow and bolded.

CRQL = contract required quantitation limits

TB = trip blank

µg/L = microgram per liter

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-101-001-CDM		GS-B-101-001-GEOSY		RPD	ABS	GS-B-102-001-CDM		GS-B-102-001-GEOSY		RPD	ABS
			12/14/2018		12/14/2018				12/17/2018		12/17/2018			
			GS-B-101-001						GS-B-102-001					
Metals														
Aluminum	40	mg/kg	3320		3120		6.21	NA	8140		7780		4.52	NA
Antimony	2	mg/kg	1.4 J		4.28		NA	2.88	0.93 J		8.88		NA	7.95
Arsenic	1	mg/kg	9.3		16.8		57.5	NA	19.4		46.8		82.8	NA
Barium	10	mg/kg	129		169 J		26.8	NA	154		159		3.19	NA
Beryllium	1	mg/kg	0.32 J		0.267 J		NA	0.05	0.46		0.279 J		NA	0.18
Cadmium	1	mg/kg	1.8		2.13 J		NA	0.33	5.2		7.41 J		35.1	NA
Calcium	1000	mg/kg	6050		6400		5.62	NA	32800		37300		12.8	NA
Chromium	2	mg/kg	19.4		21		7.92	NA	55.8		99.4		56.2	NA
Cobalt	1	mg/kg	5.2		4.88		6.35	NA	40.8		41.5		1.7	NA
Copper	2	mg/kg	126		114		10	NA	195		464		81.6	NA
Iron	20	mg/kg	11300		10400		8.29	NA	24800		36400		37.9	NA
Lead	1	mg/kg	275		289		4.96	NA	462		716		43.1	NA
Magnesium	1000	mg/kg	1010		938		NA	72	3760		5620		39.7	NA
Manganese	1	mg/kg	80.9		105		25.9	NA	197		455		79.1	NA
Mercury	0	mg/kg	30.7		20.8		38.4	NA	641		445		36.1	NA
Nickel	1	mg/kg	19.4		20.4		5.03	NA	56.9		110 J-		63.6	NA
Potassium	1000	mg/kg	415 U		255		NA	160	758		768		NA	10
Selenium	5	mg/kg	2.9 U		1.66 U		NC	NC	3 UJ		2.26 J		NA	0.74
Silver	1	mg/kg	0.83 U		1.48		NA	0.65	7.3 J-		11.8		47.1	NA
Sodium	1000	mg/kg	629		673		NA	44	1030		947 J+		NA	83
Thallium	1	mg/kg	0.67 J		1.66 U		NA	0.99	1.3 J		1.86 U		NA	0.56
Vanadium	5	mg/kg	23.3		21.2		9.44	NA	35.9		49.9 J-		32.6	NA
Zinc	2	mg/kg	205		222		7.96	NA	3530		7210		68.5	NA
Polychlorinated Biphenyl														
Aroclor 1016	66	µg/kg	37 U		30 U		NC	NC	40 U		190 U		NC	NC
Aroclor 1221	66	µg/kg	37 U		30 U		NC	NC	40 U		190 U		NC	NC
Aroclor 1232	66	µg/kg	37 U		30 U		NC	NC	40 U		190 U		NC	NC
Aroclor 1242	66	µg/kg	37 U		352 J		NA	315	40 U		190 U		NC	NC
Aroclor 1248	66	µg/kg	37 U		30 U		NC	NC	40 U		190 U		NC	NC
Aroclor 1254	66	µg/kg	460		532 J		14.5	NA	580		1570 J		92.1	NA
Aroclor 1260	66	µg/kg	220 NJ		207 J		6.09	NA	330 J		418 J		23.5	NA
Aroclor 1262	66	µg/kg	37 U		30 U		NC	NC	40 U		190 U		NC	NC

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-101-001-CDM		GS-B-101-001-GEOSY		RPD	ABS	GS-B-102-001-CDM		GS-B-102-001-GEOSY		RPD	ABS
			12/14/2018		12/14/2018				12/17/2018		12/17/2018			
			GS-B-101-001						GS-B-102-001					
Aroclor 1268	66	µg/kg	37	U	30	U	NC	NC	40	U	190	U	NC	NC
Semivolatile Organic Compound														
1,1'-Biphenyl	340	µg/kg	190	U	410	U	NC	NC	200	U	440	U	NC	NC
1,2,4,5-Tetrachlorobenzene	340	µg/kg	190	U	180	U	NC	NC	200	U	200	U	NC	NC
1,4-Dioxane ²	340	µg/kg	75	U			NC	NC	81	U			NC	NC
2,2'-Oxybis(1-chloropropane)	340	µg/kg	370	U	210	UJ	NC	NC	400	U	230	UJ	NC	NC
2,3,4,6-Tetrachlorophenol	134	µg/kg	190	U	180	UJ	NC	NC	200	U	200	R	NC	NC
2,4,5-Trichlorophenol	340	µg/kg	190	U	180	UJ	NC	NC	200	U	200	UJ	NC	NC
2,4,6-Trichlorophenol	340	µg/kg	190	U	100	UJ	NC	NC	200	U	100	UJ	NC	NC
2,4-Dichlorophenol	340	µg/kg	190	U	80	U	NC	NC	200	U	90	UJ	NC	NC
2,4-Dimethylphenol	340	µg/kg	190	U	170	U	NC	NC	200	U	180	UJ	NC	NC
2,4-Dinitrophenol	340	µg/kg	370	UJ	250	R	NC	NC	400	UJ	280	R	NC	NC
2,4-Dinitrotoluene	660	µg/kg	190	U	90	U	NC	NC	200	U	90	UJ	NC	NC
2,6-Dinitrotoluene	340	µg/kg	190	U	70	U	NC	NC	200	U	70	UJ	NC	NC
2-Chloronaphthalene	340	µg/kg	190	U	180	U	NC	NC	200	U	200	UJ	NC	NC
2-Chlorophenol	340	µg/kg	190	U	50	UJ	NC	NC	200	U	60	UJ	NC	NC
2-Methylnaphthalene	340	µg/kg	190	U	92	J	NA	98	200	U	52	J	NA	148
2-Methylphenol	340	µg/kg	370	U	180	U	NC	NC	400	U	200	UJ	NC	NC
2-Nitroaniline	660	µg/kg	190	UJ	180	U	NC	NC	200	UJ	200	U	NC	NC
2-Nitrophenol	340	µg/kg	190	U	380	UJ	NC	NC	200	U	410	R	NC	NC
3,3'-Dichlorobenzidine	340	µg/kg	370	U	140	UJ	NC	NC	400	U	150	UJ	NC	NC
3-Nitroaniline	660	µg/kg	370	UJ	180	UJ	NC	NC	400	UJ	200	UJ	NC	NC
4,6-Dinitro-2-methylphenol	660	µg/kg	370	UJ	250	R	NC	NC	400	UJ	280	R	NC	NC
4-Bromophenyl-phenylether	660	µg/kg	190	U	180	U	NC	NC	200	U	200	U	NC	NC
4-Chloro-3-methylphenol	340	µg/kg	190	U	180	U	NC	NC	200	U	200	U	NC	NC
4-Chloroaniline	340	µg/kg	370	U	180	U	NC	NC	400	U	200	U	NC	NC
4-Chlorophenyl-phenylether	660	µg/kg	190	U	180	U	NC	NC	200	U	200	U	NC	NC
4-Methylphenol	340	µg/kg	370	U			NC	NC	400	U			NC	NC
4-Nitroaniline	660	µg/kg	370	UJ	180	U	NC	NC	400	UJ	200	U	NC	NC
4-Nitrophenol	660	µg/kg	370	UJ	250	UJ	NC	NC	400	UJ	270	R	NC	NC
Acenaphthene	660	µg/kg	190	U	53	J	NA	137	87	J	150	J	NA	63
Acenaphthylene	340	µg/kg	190	U	28	J	NA	162	200	U	50	J	NA	150

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-101-001-CDM			GS-B-101-001-GEOSY			RPD	ABS	GS-B-102-001-CDM			GS-B-102-001-GEOSY			RPD	ABS
			12/14/2018			12/14/2018					12/17/2018			12/17/2018				
			GS-B-101-001								GS-B-102-001							
Acetophenone	340	µg/kg	370	U		180	U		NC	NC	400	U		200	U		NC	NC
Anthracene	660	µg/kg	190	U		78	J		NA	112	250			440			NA	190
Atrazine	340	µg/kg	370	U		150	U		NC	NC	400	U		150	UJ		NC	NC
Benzaldehyde	660	µg/kg	370	U		230	U		NC	NC	400	U		250	U		NC	NC
Benzo(a)anthracene	660	µg/kg	91	J		160	J		NA	69	890			1400	J		NA	510
Benzo(a)pyrene	340	µg/kg	93	J		160	J		NA	67	880			1700	J		63.6	NA
Benzo(b)fluoranthene	340	µg/kg	130	J		250	J		NA	120	1100			1900	J		53.3	NA
Benzo(g,h,i)perylene	340	µg/kg	50	J		120	J		NA	70	530			1200	J		NA	670
Benzo(k)fluoranthene	340	µg/kg	49	J		79	J		NA	30	350			590	J		NA	240
Bis(2-chloroethoxy)methane	340	µg/kg	190	U		200	UJ		NC	NC	200	U		200	U		NC	NC
Bis(2-chloroethyl)ether	340	µg/kg	370	U		60	UJ		NC	NC	400	U		70	UJ		NC	NC
Bis(2-ethylhexyl)phthalate	340	µg/kg	250			2600	J		NA	2350	280			640			NA	360
Butylbenzylphthalate	660	µg/kg	190	U		180	U		NC	NC	200	U		200	U		NC	NC
Caprolactam	340	µg/kg	370	U		180	U		NC	NC	400	U		200	U		NC	NC
Carbazole	660	µg/kg	370	U		33	J		NA	337	59	J		140	J		NA	81
Chrysene	660	µg/kg	99	J		210			NA	111	920			1400	J		NA	480
Dibenzo(a,h)anthracene	660	µg/kg	190	U		34	J		NA	156	160	J		260			NA	100
Dibenzofuran	340	µg/kg	190	U		36	J		NA	154	200	U		66	J		NA	134
Diethylphthalate	340	µg/kg	190	U		180	U		NC	NC	200	U		200	U		NC	NC
Dimethylphthalate	340	µg/kg	100	J		180	U		NA	80	140	J		200	U		NA	60
Di-n-butylphthalate	340	µg/kg	190	U		160	J		NA	30	170	J		56	J		NA	114
Di-n-octylphthalate	340	µg/kg	370	U		180	U		NC	NC	400	U		200	U		NC	NC
Fluoranthene	660	µg/kg	190	J		420			NA	230	1300			3000	J		NA	1700
Fluorene	660	µg/kg	190	U		78	J		NA	112	87	J		170	J		NA	83
Hexachlorobenzene	340	µg/kg	190	U		50	UJ		NC	NC	200	U		50	U		NC	NC
Hexachlorobutadiene	340	µg/kg	190	U		60	U		NC	NC	200	U		70	UJ		NC	NC
Hexachlorocyclopentadiene	340	µg/kg	370	U		510	R		NC	NC	400	U		560	R		NC	NC
Hexachloroethane	660	µg/kg	190	U		80	U		NC	NC	200	U		90	U		NC	NC
Indeno(1,2,3-cd)pyrene	340	µg/kg	48	J		130	J		NA	82	490			1200	J		NA	710
Isophorone	340	µg/kg	190	U		60	UJ		NC	NC	200	U		60	U		NC	NC
Naphthalene	340	µg/kg	410			1500	J		NA	1090	200	U		100	J		NA	100
Nitrobenzene	340	µg/kg	190	U		80	U		NC	NC	200	U		80	U		NC	NC
N-Nitroso-di-n-propylamine	340	µg/kg	190	U		40	U		NC	NC	200	U		40	U		NC	NC

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-101-001-CDM		GS-B-101-001-GEOSY		RPD	ABS	GS-B-102-001-CDM		GS-B-102-001-GEOSY		RPD	ABS
			12/14/2018		12/14/2018				12/17/2018		12/17/2018			
			GS-B-101-001						GS-B-102-001					
N-Nitrosodiphenylamine	340	µg/kg	230		1000	J	NA	770	200	U	40	U	NC	NC
Pentachlorophenol	660	µg/kg	370	U	110	UJ	NC	NC	400	U	120	UJ	NC	NC
Phenanthrene	340	µg/kg	130	J	330	J	NA	200	1000		1500	J	40	NA
Phenol	660	µg/kg	99	J	180	U	NA	81	130	J	200	UJ	NA	70
Pyrene	340	µg/kg	200		360		NA	160	1900		3300	J	53.8	NA

Notes:

1. Sample pairs with RPD or ABS outside of criteria in the table are highlighted in yellow
2. PRP's laboratory analyzed 1,4-dioxane as a volatile organic compound.

ABS = absolute difference

CRQL = contract required quantitation limit

mg/kg = milligram per kilogram

NA = not applicable

NC = not calculable

PCB = polychlorinated biphenyl

RPD = relative percent difference

SVOC = semivolatile organic compound

µg/kg = microgram per kilogram

Data Validation Qualifiers

J = The analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample.

J+ = The result is an estimated quantity, but the result may be biased high.

J- = The result is an estimated quantity, but the result may be biased low.

NJ = The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

R = The sample results are unusable due to poor data quality; certain criteria were not met. The analyte may or may not be present in the sample at the reported concentration.

U = The analyte was not detected at a level greater than or equal to the level of the sample CRQL.

UJ = The analyte was not detected; however, the reported CRQL is approximate and may be inaccurate or imprecise.

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-102-002-CDM				GS-B-102-002-GEOSY				RPD	ABS	GS-B-111-001-CDM				GS-B-111-001-GEOSY				RPD	ABS
			12/17/2018				12/17/2018						12/17/2018				12/17/2018					
			GS-B-102-002										GS-B-111-001									
Metals																						
Aluminum	40	mg/kg	17000			10400			48.2	NA	8500			8930			4.93	NA				
Antimony	2	mg/kg	0.53 J			0.859 J			NA	0.33	4.7 U			4.53 U			NC	NC				
Arsenic	1	mg/kg	8			4.32			59.7	NA	2.3			3.32			NA	1.02				
Barium	10	mg/kg	364			161 J			77.3	NA	63.3			44.4			35.1	NA				
Beryllium	1	mg/kg	0.74			0.465 J			NA	0.28	1.3			0.672			NA	0.63				
Cadmium	1	mg/kg	0.4 J			1.19 U			NA	0.79	0.75			0.273 J			NA	0.48				
Calcium	1000	mg/kg	6340			3400 J			60.4	NA	14900			20200			30.2	NA				
Chromium	2	mg/kg	15.9			9.14 J			54	NA	23.2			25.5			9.45	NA				
Cobalt	1	mg/kg	8.6			3.26			90.1	NA	34.8			27.6			23.1	NA				
Copper	2	mg/kg	34.3			20.3			51.3	NA	175			120			37.3	NA				
Iron	20	mg/kg	11500			6020			62.6	NA	14700			15300			4	NA				
Lead	1	mg/kg	60.9			21.9			94.2	NA	248			175			34.5	NA				
Magnesium	1000	mg/kg	493 J			225 J			NA	268	5430			6170			12.8	NA				
Manganese	1	mg/kg	50.9			24.7			69.3	NA	106			118			10.7	NA				
Mercury	0	mg/kg	12.5			9.77			24.5	NA	74.5			75.6			1.47	NA				
Nickel	1	mg/kg	12.1			7.83 J			42.8	NA	80.6			48.7			49.3	NA				
Potassium	1000	mg/kg	1210			796			NA	414	466			775			NA	309				
Selenium	5	mg/kg	4.2 U			0.537 J			NA	3.66	2.7 U			1.82 U			NC	NC				
Silver	1	mg/kg	1.2 U			1.19 U			NC	NC	0.83			2.21			NA	1.38				
Sodium	1000	mg/kg	2750			1680 J			NA	1070	922			1010			NA	88				
Thallium	1	mg/kg	0.56 J			2.39 U			NA	1.83	1.1 J			1.82 U			NA	0.72				
Vanadium	5	mg/kg	21.3			12.2			NA	9.1	31.7			41.2			26.1	NA				
Zinc	2	mg/kg	74.5			26.7			94.5	NA	384			359			6.73	NA				
Polychlorinated Biphenyl																						
Aroclor 1016	66	µg/kg	56 U			50 U			NC	NC	37 U			30 U			NC	NC				
Aroclor 1221	66	µg/kg	56 U			50 U			NC	NC	37 U			30 U			NC	NC				
Aroclor 1232	66	µg/kg	56 U			50 U			NC	NC	37 U			30 U			NC	NC				
Aroclor 1242	66	µg/kg	56 U			50 U			NC	NC	37 U			30 U			NC	NC				
Aroclor 1248	66	µg/kg	56 U			48.4 J			NA	7.6	37 U			30 U			NC	NC				
Aroclor 1254	66	µg/kg	56 U			66.7 J			NA	10.7	37 U			52.3 J			NA	15.3				
Aroclor 1260	66	µg/kg	56 U			29.9 J			NA	26.1	37 U			32.2 J			NA	4.8				
Aroclor 1262	66	µg/kg	56 U			50 U			NC	NC	37 U			30 U			NC	NC				

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-102-002-CDM		GS-B-102-002-GEOSY		RPD	ABS	GS-B-111-001-CDM		GS-B-111-001-GEOSY		RPD	ABS
			12/17/2018		12/17/2018				12/17/2018		12/17/2018			
			GS-B-102-002						GS-B-111-001					
Aroclor 1268	66	µg/kg	56	U	50	U	NC	NC	37	U	30	U	NC	NC
Semivolatile Organic Compound														
1,1'-Biphenyl	340	µg/kg	290	U	560	U	NC	NC	190	U	460	U	NC	NC
1,2,4,5-Tetrachlorobenzene	340	µg/kg	290	U	250	U	NC	NC	190	U	200	U	NC	NC
1,4-Dioxane ²	340	µg/kg	110	U			NC	NC	75	U			NC	NC
2,2'-Oxybis(1-chloropropane)	340	µg/kg	560	U	300	U	NC	NC	370	U	230	U	NC	NC
2,3,4,6-Tetrachlorophenol	134	µg/kg	290	U	250	U	NC	NC	190	U	200	UJ	NC	NC
2,4,5-Trichlorophenol	340	µg/kg	290	U	250	U	NC	NC	190	U	200	UJ	NC	NC
2,4,6-Trichlorophenol	340	µg/kg	290	U	140	U	NC	NC	190	U	100	UJ	NC	NC
2,4-Dichlorophenol	340	µg/kg	290	U	110	U	NC	NC	190	U	90	UJ	NC	NC
2,4-Dimethylphenol	340	µg/kg	290	U	230	U	NC	NC	190	U	180	UJ	NC	NC
2,4-Dinitrophenol	340	µg/kg	560	U	360	U	NC	NC	370	UJ	280	UJ	NC	NC
2,4-Dinitrotoluene	660	µg/kg	290	U	110	U	NC	NC	190	U	100	U	NC	NC
2,6-Dinitrotoluene	340	µg/kg	290	U	90	U	NC	NC	190	U	70	U	NC	NC
2-Chloronaphthalene	340	µg/kg	290	U	250	U	NC	NC	190	U	200	U	NC	NC
2-Chlorophenol	340	µg/kg	290	U	80	U	NC	NC	190	U	60	UJ	NC	NC
2-Methylnaphthalene	340	µg/kg	290	U	300	U	NC	NC	190	U	230	U	NC	NC
2-Methylphenol	340	µg/kg	560	U	250	U	NC	NC	370	U	200	UJ	NC	NC
2-Nitroaniline	660	µg/kg	290	U	250	U	NC	NC	190	UJ	200	U	NC	NC
2-Nitrophenol	340	µg/kg	290	U	540	U	NC	NC	190	U	430	UJ	NC	NC
3,3'-Dichlorobenzidine	340	µg/kg	560	U	180	UJ	NC	NC	370	U	150	UJ	NC	NC
3-Nitroaniline	660	µg/kg	560	U	250	UJ	NC	NC	370	UJ	200	UJ	NC	NC
4,6-Dinitro-2-methylphenol	660	µg/kg	560	U	360	U	NC	NC	370	UJ	280	U	NC	NC
4-Bromophenyl-phenylether	660	µg/kg	290	U	250	U	NC	NC	190	U	200	U	NC	NC
4-Chloro-3-methylphenol	340	µg/kg	290	U	250	U	NC	NC	190	U	200	U	NC	NC
4-Chloroaniline	340	µg/kg	560	U	250	U	NC	NC	370	U	200	U	NC	NC
4-Chlorophenyl-phenylether	660	µg/kg	290	U	250	U	NC	NC	190	U	200	U	NC	NC
4-Methylphenol	340	µg/kg	560	U			NC	NC	370	U			NC	NC
4-Nitroaniline	660	µg/kg	560	U	250	U	NC	NC	370	UJ	200	U	NC	NC
4-Nitrophenol	660	µg/kg	560	U	340	U	NC	NC	370	UJ	280	UJ	NC	NC
Acenaphthene	660	µg/kg	290	U	83	J	NA	207	190	U	150	U	NC	NC
Acenaphthylene	340	µg/kg	290	U	200	U	NC	NC	190	U	150	U	NC	NC

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-102-002-CDM		GS-B-102-002-GEOSY		RPD	ABS	GS-B-111-001-CDM		GS-B-111-001-GEOSY		RPD	ABS
			12/17/2018		12/17/2018				12/17/2018		12/17/2018			
			GS-B-102-002						GS-B-111-001					
Acetophenone	340	µg/kg	560	U	250	U	NC	NC	370	U	200	U	NC	NC
Anthracene	660	µg/kg	290	U	150	J	NA	140	190	U	23	J	NA	167
Atrazine	340	µg/kg	560	U	200	U	NC	NC	370	U	150	U	NC	NC
Benzaldehyde	660	µg/kg	560	U	330	U	NC	NC	370	U	250	U	NC	NC
Benzo(a)anthracene	660	µg/kg	130	J	790		NA	660	41	J	70		NA	29
Benzo(a)pyrene	340	µg/kg	210	J	1400		NA	1190	46	J	83	J	NA	37
Benzo(b)fluoranthene	340	µg/kg	260	J	1800		NA	1540	54	J	100		NA	46
Benzo(g,h,i)perylene	340	µg/kg	140	J	1300		NA	1160	190	U	66	J	NA	124
Benzo(k)fluoranthene	340	µg/kg	100	J	530		NA	430	190	U	38	J	NA	152
Bis(2-chloroethoxy)methane	340	µg/kg	290	U	270	U	NC	NC	190	U	210	U	NC	NC
Bis(2-chloroethyl)ether	340	µg/kg	560	U	90	U	NC	NC	370	U	70	U	NC	NC
Bis(2-ethylhexyl)phthalate	340	µg/kg	290	U	250	U	NC	NC	850		290		NA	560
Butylbenzylphthalate	660	µg/kg	290	U	250	U	NC	NC	190	U	200	U	NC	NC
Caprolactam	340	µg/kg	560	U	250	U	NC	NC	370	U	200	U	NC	NC
Carbazole	660	µg/kg	560	U	80	J	NA	480	370	U	200	U	NC	NC
Chrysene	660	µg/kg	130	J	820		NA	690	38	J	74	J	NA	36
Dibenzo(a,h)anthracene	660	µg/kg	290	U	230		NA	60	190	U	70	U	NC	NC
Dibenzofuran	340	µg/kg	290	U	34	J	NA	256	190	U	200	U	NC	NC
Diethylphthalate	340	µg/kg	290	U	250	U	NC	NC	190	U	200	U	NC	NC
Dimethylphthalate	340	µg/kg	130	J	250	U	NA	120	99	J	200	U	NA	101
Di-n-butylphthalate	340	µg/kg	290	U	250	U	NC	NC	190	U	200	U	NC	NC
Di-n-octylphthalate	340	µg/kg	560	U	250	U	NC	NC	370	U	200	U	NC	NC
Fluoranthene	660	µg/kg	170	J	1000	J	NA	830	370	U	100	J	NA	270
Fluorene	660	µg/kg	290	U	250	U	NC	NC	190	U	200	U	NC	NC
Hexachlorobenzene	340	µg/kg	290	U	70	U	NC	NC	190	U	50	U	NC	NC
Hexachlorobutadiene	340	µg/kg	290	U	90	U	NC	NC	190	U	70	U	NC	NC
Hexachlorocyclopentadiene	340	µg/kg	560	U	700	U	NC	NC	370	U	560	U	NC	NC
Hexachloroethane	660	µg/kg	290	U	110	U	NC	NC	190	U	90	U	NC	NC
Indeno(1,2,3-cd)pyrene	340	µg/kg	130	J	1200		NA	1070	190	U	63	J	NA	127
Isophorone	340	µg/kg	290	U	80	U	NC	NC	190	U	60	U	NC	NC
Naphthalene	340	µg/kg	290	U	58	J	NA	232	190	U	200	U	NC	NC
Nitrobenzene	340	µg/kg	290	U	100	U	NC	NC	190	U	80	U	NC	NC
N-Nitroso-di-n-propylamine	340	µg/kg	290	U	60	U	NC	NC	190	U	50	U	NC	NC

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-102-002-CDM		GS-B-102-002-GEOSY		RPD	ABS	GS-B-111-001-CDM		GS-B-111-001-GEOSY		RPD	ABS
			12/17/2018		12/17/2018				12/17/2018		12/17/2018			
			GS-B-102-002						GS-B-111-001					
N-Nitrosodiphenylamine	340	µg/kg	290	U	60	U	NC	NC	190	U	40	U	NC	NC
Pentachlorophenol	660	µg/kg	560	U	150	U	NC	NC	370	U	120	UJ	NC	NC
Phenanthrene	340	µg/kg	81	J	560	J	NA	479	190	U	69	J	NA	121
Phenol	660	µg/kg	170	J	250	U	NA	80	98	J	200	UJ	NA	102
Pyrene	340	µg/kg	170	J	990	J	NA	820	190	U	100	J	NA	90

Notes:

1. Sample pairs with RPD or ABS outside of criteria in the table are highlighted in yellow
2. PRP's laboratory analyzed 1,4-dioxane as a volatile organic compound.

ABS = absolute difference

CRQL = contract required quantitation limit

mg/kg = milligram per kilogram

NA = not applicable

NC = not calculable

PCB = polychlorinated biphenyl

RPD = relative percent difference

SVOC = semivolatile organic compound

µg/kg = microgram per kilogram

Data Validation Qualifiers

J = The analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample.

J+ = The result is an estimated quantity, but the result may be biased high.

J- = The result is an estimated quantity, but the result may be biased low.

NJ = The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

R = The sample results are unusable due to poor data quality; certain criteria were not met. The analyte may or may not be present in the sample at the reported concentration.

U = The analyte was not detected at a level greater than or equal to the level of the sample CRQL.

UJ = The analyte was not detected; however, the reported CRQL is approximate and may be inaccurate or imprecise.

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-112-001-CDM			GS-B-112-001-GEOSY			RPD	ABS	GS-SS-101-001-CDM			GS-SS-101-001-GEOSY			RPD	ABS
			12/13/2018			12/13/2018					12/4/2018			12/4/2018				
			GS-B-112-001								GS-SS-101-001							
Metals																		
Aluminum	40	mg/kg	6110		5550		9.61	NA	6270		6460		2.99	NA				
Antimony	2	mg/kg	0.44 J		2.02 J		NA	1.58	1.6 J		4.3 J		NA	2.7				
Arsenic	1	mg/kg	6.2		6.75 J		8.49	NA	11.5		13.7		17.5	NA				
Barium	10	mg/kg	67.4		56.1 J		18.3	NA	142		152		6.8	NA				
Beryllium	1	mg/kg	0.32 J		0.193 J		NA	0.13	0.52		0.339 J		NA	0.18				
Cadmium	1	mg/kg	3.8		4.18		9.52	NA	1.9		1.58		NA	0.32				
Calcium	1000	mg/kg	7680		6720 J		13.3	NA	12300		9120		29.7	NA				
Chromium	2	mg/kg	14.3		14		2.12	NA	29		33.4 J		14.1	NA				
Cobalt	1	mg/kg	17.8		17.8		0	NA	24.2		30.4		22.7	NA				
Copper	2	mg/kg	109		94.8		13.9	NA	121		111		8.62	NA				
Iron	20	mg/kg	14900		14500		2.72	NA	25400		20300		22.3	NA				
Lead	1	mg/kg	150		131		13.5	NA	805		670 J		18.3	NA				
Magnesium	1000	mg/kg	3200		3390		5.77	NA	2050		2760 J		NA	710				
Manganese	1	mg/kg	188		205		8.65	NA	300		337		11.6	NA				
Mercury	0	mg/kg	61.7		75.4		20	NA	138		157		12.9	NA				
Nickel	1	mg/kg	19.5		18.2		6.9	NA	32.5		29.2 J		10.7	NA				
Potassium	1000	mg/kg	460		440		NA	20	653		696		NA	43				
Selenium	5	mg/kg	2.8 U		1.75 U		NC	NC	3 U		0.578 J		NA	2.42				
Silver	1	mg/kg	3		3.1 J		3.28	NA	1.8		2.45		NA	0.65				
Sodium	1000	mg/kg	439		382		NA	57	833		875 J+		NA	42				
Thallium	1	mg/kg	0.88 J		1.75 U		NA	0.87	1.2 J		1.83 U		NA	0.63				
Vanadium	5	mg/kg	34.6		34.7		0.29	NA	26.8		27.4		2.21	NA				
Zinc	2	mg/kg	149		138 J		7.67	NA	305		277		9.62	NA				
Polychlorinated Biphenyl																		
Aroclor 1016	66	µg/kg	36 U		30 U		NC	NC	40 U		30 U		NC	NC				
Aroclor 1221	66	µg/kg	36 U		30 U		NC	NC	40 U		30 U		NC	NC				
Aroclor 1232	66	µg/kg	36 U		30 U		NC	NC	40 U		30 U		NC	NC				
Aroclor 1242	66	µg/kg	36 U		30 U		NC	NC	40 U		82.8 JN		NA	42.8				
Aroclor 1248	66	µg/kg	36 U		30 U		NC	NC	40 U		30 U		NC	NC				
Aroclor 1254	66	µg/kg	170		198 J		15.2	NA	180		601 J		108	NA				
Aroclor 1260	66	µg/kg	95 NJ		50.4 J		NA	44.6	170		389 J		78.4	NA				
Aroclor 1262	66	µg/kg	36 U		30 U		NC	NC	40 U		30 U		NC	NC				

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-112-001-CDM		GS-B-112-001-GEOSY		RPD	ABS	GS-SS-101-001-CDM		GS-SS-101-001-GEOSY		RPD	ABS
			12/13/2018		12/13/2018				12/4/2018		12/4/2018			
			GS-B-112-001						GS-SS-101-001					
Aroclor 1268	66	µg/kg	36	U	30	U	NC	NC	40	U	30	U	NC	NC
Semivolatile Organic Compound														
1,1'-Biphenyl	340	µg/kg	930	U	2000	U	NC	NC	210	U	890	UJ	NC	NC
1,2,4,5-Tetrachlorobenzene	340	µg/kg	930	U	890	U	NC	NC	210	U	380	UJ	NC	NC
1,4-Dioxane ²	340	µg/kg	370	R			NC	NC	81	UJ			NC	NC
2,2'-Oxybis(1-chloropropane)	340	µg/kg	1800	U	1100	U	NC	NC	400	U	460	UJ	NC	NC
2,3,4,6-Tetrachlorophenol	134	µg/kg	930	U	890	UJ	NC	NC	210	U	380	UJ	NC	NC
2,4,5-Trichlorophenol	340	µg/kg	930	U	890	U	NC	NC	210	U	380	UJ	NC	NC
2,4,6-Trichlorophenol	340	µg/kg	930	U	500	U	NC	NC	210	U	210	UJ	NC	NC
2,4-Dichlorophenol	340	µg/kg	930	U	430	U	NC	NC	210	U	180	UJ	NC	NC
2,4-Dimethylphenol	340	µg/kg	930	U	860	U	NC	NC	210	U	370	UJ	NC	NC
2,4-Dinitrophenol	340	µg/kg	1800	UJ	1290	U	NC	NC	400	UJ	560	U	NC	NC
2,4-Dinitrotoluene	660	µg/kg	930	U	440	U	NC	NC	210	U	200	UJ	NC	NC
2,6-Dinitrotoluene	340	µg/kg	930	U	360	U	NC	NC	210	U	150	UJ	NC	NC
2-Chloronaphthalene	340	µg/kg	930	U	890	U	NC	NC	210	U	380	UJ	NC	NC
2-Chlorophenol	340	µg/kg	930	U	300	U	NC	NC	210	U	120	UJ	NC	NC
2-Methylnaphthalene	340	µg/kg	930	U	1100	U	NC	NC	210	U	130	J	NA	80
2-Methylphenol	340	µg/kg	1800	U	890	U	NC	NC	400	U	380	UJ	NC	NC
2-Nitroaniline	660	µg/kg	930	UJ	890	U	NC	NC	210	U	380	UJ	NC	NC
2-Nitrophenol	340	µg/kg	930	U	1890	U	NC	NC	210	U	850	UJ	NC	NC
3,3'-Dichlorobenzidine	340	µg/kg	1800	U	680	UJ	NC	NC	400	U	300	UJ	NC	NC
3-Nitroaniline	660	µg/kg	1800	UJ	890	UJ	NC	NC	400	U	380	UJ	NC	NC
4,6-Dinitro-2-methylphenol	660	µg/kg	1800	UJ	1290	U	NC	NC	400	UJ	560	UJ	NC	NC
4-Bromophenyl-phenylether	660	µg/kg	930	U	890	UJ	NC	NC	210	U	380	UJ	NC	NC
4-Chloro-3-methylphenol	340	µg/kg	930	U	890	U	NC	NC	210	U	380	UJ	NC	NC
4-Chloroaniline	340	µg/kg	1800	U	890	U	NC	NC	400	U	380	UJ	NC	NC
4-Chlorophenyl-phenylether	660	µg/kg	930	U	890	UJ	NC	NC	210	U	380	UJ	NC	NC
4-Methylphenol	340	µg/kg	1800	U			NC	NC	400	U			NC	NC
4-Nitroaniline	660	µg/kg	1800	UJ	890	U	NC	NC	400	U	380	UJ	NC	NC
4-Nitrophenol	660	µg/kg	1800	UJ	1290	U	NC	NC	400	U	550	U	NC	NC
Acenaphthene	660	µg/kg	190	J	120	J	NA	70	130	J	450	J	NA	320
Acenaphthylene	340	µg/kg	930	U	720	U	NC	NC	84	J	400	J	NA	316

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-112-001-CDM		GS-B-112-001-GEOSY		RPD	ABS	GS-SS-101-001-CDM		GS-SS-101-001-GEOSY		RPD	ABS
			12/13/2018		12/13/2018				12/4/2018		12/4/2018			
			GS-B-112-001						GS-SS-101-001					
Acetophenone	340	µg/kg	1800	U	890	U	NC	NC	400	U	380	UJ	NC	NC
Anthracene	660	µg/kg	820	J	760		NA	60	550		1100	J	NA	550
Atrazine	340	µg/kg	1800	U	720	U	NC	NC	400	U	310	UJ	NC	NC
Benzaldehyde	660	µg/kg	1800	U	1200	U	NC	NC	400	U	100	J	NA	300
Benzo(a)anthracene	660	µg/kg	2900		2100		32	NA	1200		3900	J	NA	2700
Benzo(a)pyrene	340	µg/kg	2200		1800		20	NA	1000		4100	J	122	NA
Benzo(b)fluoranthene	340	µg/kg	3400		2600		26.7	NA	1400		5200	J	115	NA
Benzo(g,h,i)perylene	340	µg/kg	1000		1000		0	NA	590		2700	J	NA	2110
Benzo(k)fluoranthene	340	µg/kg	1400		1200		15.4	NA	430		1700	J	NA	1270
Bis(2-chloroethoxy)methane	340	µg/kg	930	U	970	UJ	NC	NC	210	U	410	UJ	NC	NC
Bis(2-chloroethyl)ether	340	µg/kg	1800	U	310	UJ	NC	NC	400	U	140	UJ	NC	NC
Bis(2-ethylhexyl)phthalate	340	µg/kg	930	U	120	J	NA	810	210	U	380	UJ	NC	NC
Butylbenzylphthalate	660	µg/kg	930	U	890	U	NC	NC	210	U	380	UJ	NC	NC
Caprolactam	340	µg/kg	1800	U	890	U	NC	NC	400	U	380	U	NC	NC
Carbazole	660	µg/kg	800	J	480	J	NA	320	120	J	330	J	NA	210
Chrysene	660	µg/kg	2800		2100		28.6	NA	1200		4100	J	NA	2900
Dibenzo(a,h)anthracene	660	µg/kg	420	J	310		NA	110	180	J	650	J	NA	470
Dibenzofuran	340	µg/kg	190	J	120	J	NA	70	63	J	260	J	NA	197
Diethylphthalate	340	µg/kg	930	U	890	U	NC	NC	210	U	380	UJ	NC	NC
Dimethylphthalate	340	µg/kg	930	U	890	U	NC	NC	64	J	380	UJ	NA	316
Di-n-butylphthalate	340	µg/kg	930	U	890	U	NC	NC	210	U	380	UJ	NC	NC
Di-n-octylphthalate	340	µg/kg	1800	U	890	U	NC	NC	400	U	380	U	NC	NC
Fluoranthene	660	µg/kg	6200		4300		36.2	NA	2500		7500	J	100	NA
Fluorene	660	µg/kg	190	J	110	J	NA	80	140	J	360	J	NA	220
Hexachlorobenzene	340	µg/kg	930	U	250	UJ	NC	NC	210	U	100	UJ	NC	NC
Hexachlorobutadiene	340	µg/kg	930	U	330	UJ	NC	NC	210	U	150	UJ	NC	NC
Hexachlorocyclopentadiene	340	µg/kg	1800	U	2590	U	NC	NC	400	UJ	1100	U	NC	NC
Hexachloroethane	660	µg/kg	930	U	430	U	NC	NC	210	U	180	U	NC	NC
Indeno(1,2,3-cd)pyrene	340	µg/kg	1100	J	1300		16.7	NA	590		2800	J	NA	2210
Isophorone	340	µg/kg	930	U	300	UJ	NC	NC	210	U	120	UJ	NC	NC
Naphthalene	340	µg/kg	930	U	890	U	NC	NC	70	J	370	J	NA	300
Nitrobenzene	340	µg/kg	930	U	400	UJ	NC	NC	210	U	170	UJ	NC	NC
N-Nitroso-di-n-propylamine	340	µg/kg	930	U	230	U	NC	NC	210	U	90	UJ	NC	NC

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-112-001-CDM		GS-B-112-001-GEOSY		RPD	ABS	GS-SS-101-001-CDM		GS-SS-101-001-GEOSY		RPD	ABS
			12/13/2018		12/13/2018				12/4/2018		12/4/2018			
			GS-B-112-001						GS-SS-101-001					
N-Nitrosodiphenylamine	340	µg/kg	930	U	210	UJ	NC	NC	210	U	90	UJ	NC	NC
Pentachlorophenol	660	µg/kg	1800	U	580	U	NC	NC	400	U	250	U	NC	NC
Phenanthrene	340	µg/kg	4700		2300	J	68.6	NA	1700		3800	J	76.4	NA
Phenol	660	µg/kg	1800	U	890	U	NC	NC	95	J	54	J	NA	41
Pyrene	340	µg/kg	5600		3500		46.2	NA	2700		7600	J	95.1	NA

Notes:

1. Sample pairs with RPD or ABS outside of criteria in the table are highlighted in yellow
2. PRP's laboratory analyzed 1,4-dioxane as a volatile organic compound.

ABS = absolute difference

CRQL = contract required quantitation limit

mg/kg = milligram per kilogram

NA = not applicable

NC = not calculable

PCB = polychlorinated biphenyl

RPD = relative percent difference

SVOC = semivolatile organic compound

µg/kg = microgram per kilogram

Data Validation Qualifiers

J = The analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample.

J+ = The result is an estimated quantity, but the result may be biased high.

J- = The result is an estimated quantity, but the result may be biased low.

NJ = The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

R = The sample results are unusable due to poor data quality; certain criteria were not met. The analyte may or may not be present in the sample at the reported concentration.

U = The analyte was not detected at a level greater than or equal to the level of the sample CRQL.

UJ = The analyte was not detected; however, the reported CRQL is approximate and may be inaccurate or imprecise.

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-SS-101-002-CDM		GS-SS-101-002-GEOSY		RPD	ABS	GS-SS-111-001-CDM		GS-SS-111-001-GEOSY		RPD	ABS
			12/4/2018		12/4/2018				12/4/2018		12/4/2018			
			GS-SS-101-002						GS-SS-111-001					
Metals														
Aluminum	40	mg/kg	6150		6160		0.16	NA	5390		4520		17.6	NA
Antimony	2	mg/kg	0.73 J		3.59 J		NA	2.86	0.92 J		2.99 J		NA	2.07
Arsenic	1	mg/kg	8.2		10.5		24.6	NA	13		22.1		51.9	NA
Barium	10	mg/kg	121		131		7.94	NA	90.1		78.4		13.9	NA
Beryllium	1	mg/kg	0.45		0.316 J		NA	0.13	0.42		0.279 J		NA	0.14
Cadmium	1	mg/kg	1.6		1.5		NA	0.1	0.59		0.643 J		NA	0.05
Calcium	1000	mg/kg	17800		39000		74.6	NA	7300		6480		11.9	NA
Chromium	2	mg/kg	46.3		31		39.6	NA	18.6		17.8		4.4	NA
Cobalt	1	mg/kg	25		20.6		19.3	NA	9.9		8.34		17.1	NA
Copper	2	mg/kg	85		74		13.8	NA	54.9		62.7		13.3	NA
Iron	20	mg/kg	18600		16200		13.8	NA	24100		26900		11	NA
Lead	1	mg/kg	613		449		30.9	NA	228		326		35.4	NA
Magnesium	1000	mg/kg	2430		2500		NA	70	2770		2390		NA	380
Manganese	1	mg/kg	289		272		6.06	NA	265		453		52.4	NA
Mercury	0	mg/kg	101		214		71.7	NA	5.4 J-		5.14		4.93	NA
Nickel	1	mg/kg	23.7		18.8		23.1	NA	14.6		13.3		9.32	NA
Potassium	1000	mg/kg	562		641		NA	79	448		443		NA	5
Selenium	5	mg/kg	3 U		0.642 J		NA	2.36	2.8 UJ		0.719 J		NA	2.08
Silver	1	mg/kg	0.87 U		1.95		NA	1.08	0.8 UJ		0.516 J		NA	0.28
Sodium	1000	mg/kg	723		919		NA	196	1350		1430		NA	80
Thallium	1	mg/kg	0.8 J		1.86 U		NA	1.06	0.89 J		1.69 U		NA	0.8
Vanadium	5	mg/kg	26.7		23.8		11.5	NA	34.2		31		9.82	NA
Zinc	2	mg/kg	231		210		9.52	NA	190		766		121	NA
Polychlorinated Biphenyl														
Aroclor 1016	66	µg/kg	39 U		40 U		NC	NC	36 U		30 U		NC	NC
Aroclor 1221	66	µg/kg	39 U		40 U		NC	NC	36 U		30 U		NC	NC
Aroclor 1232	66	µg/kg	39 U		40 U		NC	NC	36 U		30 U		NC	NC
Aroclor 1242	66	µg/kg	39 U		73.3 JN		NA	34.3	36 U		30 U		NC	NC
Aroclor 1248	66	µg/kg	39 U		40 U		NC	NC	36 U		30 U		NC	NC
Aroclor 1254	66	µg/kg	160		417 J		NA	257	78 J		121 J		NA	43
Aroclor 1260	66	µg/kg	120 J		189 J		NA	69	85 NJ		83.5 J		NA	1.5
Aroclor 1262	66	µg/kg	39 U		40 U		NC	NC	36 U		30 U		NC	NC

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-SS-101-002-CDM	GS-SS-101-002-GEOSY	RPD	ABS	GS-SS-111-001-CDM	GS-SS-111-001-GEOSY	RPD	ABS
			12/4/2018	12/4/2018			12/4/2018	12/4/2018		
			GS-SS-101-002				GS-SS-111-001			
Aroclor 1268	66	µg/kg	39 U	40 U	NC	NC	36 U	30 U	NC	NC
Semivolatile Organic Compound										
1,1'-Biphenyl	340	µg/kg	200 U	290 J	NA	90	190 U	204 J	NA	14
1,2,4,5-Tetrachlorobenzene	340	µg/kg	200 U	400 UJ	NC	NC	190 U	2090 UJ	NC	NC
1,4-Dioxane ²	340	µg/kg	79 UJ		NC	NC	73 UJ	890 UJ	NC	NC
2,2'-Oxybis(1-chloropropane)	340	µg/kg	390 U	470 UJ	NC	NC	360 U		NC	NC
2,3,4,6-Tetrachlorophenol	134	µg/kg	200 U	400 UJ	NC	NC	190 U	1100 UJ	NC	NC
2,4,5-Trichlorophenol	340	µg/kg	200 U	400 UJ	NC	NC	190 U	890 UJ	NC	NC
2,4,6-Trichlorophenol	340	µg/kg	200 U	230 UJ	NC	NC	190 U	890 UJ	NC	NC
2,4-Dichlorophenol	340	µg/kg	200 U	180 UJ	NC	NC	190 U	510 UJ	NC	NC
2,4-Dimethylphenol	340	µg/kg	200 U	370 UJ	NC	NC	190 U	430 UJ	NC	NC
2,4-Dinitrophenol	340	µg/kg	390 UJ	570 U	NC	NC	360 UJ	860 UJ	NC	NC
2,4-Dinitrotoluene	660	µg/kg	200 U	200 UJ	NC	NC	190 U	1290 U	NC	NC
2,6-Dinitrotoluene	340	µg/kg	200 U	150 UJ	NC	NC	190 U	440 UJ	NC	NC
2-Chloronaphthalene	340	µg/kg	200 U	400 UJ	NC	NC	190 U	360 UJ	NC	NC
2-Chlorophenol	340	µg/kg	200 U	120 UJ	NC	NC	190 U	890 UJ	NC	NC
2-Methylnaphthalene	340	µg/kg	100 J	790 J	NA	690	150 J	300 UJ	NA	150
2-Methylphenol	340	µg/kg	390 U	400 UJ	NC	NC	360 U	260 J	NA	100
2-Nitroaniline	660	µg/kg	200 U	400 UJ	NC	NC	190 U	890 UJ	NC	NC
2-Nitrophenol	340	µg/kg	200 U	870 UJ	NC	NC	190 U	890 UJ	NC	NC
3,3'-Dichlorobenzidine	340	µg/kg	390 U	310 UJ	NC	NC	360 U	2000 UJ	NC	NC
3-Nitroaniline	660	µg/kg	390 U	400 UJ	NC	NC	360 U	680 UJ	NC	NC
4,6-Dinitro-2-methylphenol	660	µg/kg	390 UJ	570 UJ	NC	NC	360 U	890 UJ	NC	NC
4-Bromophenyl-phenylether	660	µg/kg	200 U	400 UJ	NC	NC	190 U	1290 UJ	NC	NC
4-Chloro-3-methylphenol	340	µg/kg	200 U	400 UJ	NC	NC	190 U	890 UJ	NC	NC
4-Chloroaniline	340	µg/kg	390 U	400 UJ	NC	NC	360 U	890 UJ	NC	NC
4-Chlorophenyl-phenylether	660	µg/kg	200 U	400 UJ	NC	NC	190 U	890 UJ	NC	NC
4-Methylphenol	340	µg/kg	390 U		NC	NC	360 U	890 UJ	NC	NC
4-Nitroaniline	660	µg/kg	390 U	400 UJ	NC	NC	360 U		NC	NC
4-Nitrophenol	660	µg/kg	390 U	560 U	NC	NC	360 U	890 UJ	NC	NC
Acenaphthene	660	µg/kg	400	2200 J	NA	1800	190 U	1290 U	NC	NC
Acenaphthylene	340	µg/kg	200 U	480 J	NA	280	190 U	720 UJ	NC	NC

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-SS-101-002-CDM		GS-SS-101-002-GEOSY		RPD	ABS	GS-SS-111-001-CDM		GS-SS-111-001-GEOSY		RPD	ABS
			12/4/2018		12/4/2018				12/4/2018		12/4/2018			
			GS-SS-101-002						GS-SS-111-001					
Acetophenone	340	µg/kg	390	U	400	UJ	NC	NC	360	U	720	UJ	NC	NC
Anthracene	660	µg/kg	1000		5400	J	NA	4400	190	U	890	UJ	NC	NC
Atrazine	340	µg/kg	390	U	310	UJ	NC	NC	360	U	540	UJ	NC	NC
Benzaldehyde	660	µg/kg	390	U	520	U	NC	NC	360	U	720	UJ	NC	NC
Benzo(a)anthracene	660	µg/kg	1900		8600	J	128	NA	180	J	1200	U	NA	1020
Benzo(a)pyrene	340	µg/kg	1500		8300	J	139	NA	200		340	J	NA	140
Benzo(b)fluoranthene	340	µg/kg	1800		9800	J	138	NA	280		520	J	NA	240
Benzo(g,h,i)perylene	340	µg/kg	870		5400	J	144	NA	170	J	660	J	NA	490
Benzo(k)fluoranthene	340	µg/kg	600		2800	J	NA	2200	83	J	410	J	NA	327
Bis(2-chloroethoxy)methane	340	µg/kg	200	U	430	UJ	NC	NC	190	U	240	J	NA	50
Bis(2-chloroethyl)ether	340	µg/kg	390	U	140	UJ	NC	NC	360	U	980	UJ	NC	NC
Bis(2-ethylhexyl)phthalate	340	µg/kg	420		2900	J	NA	2480	190	U	310	UJ	NC	NC
Butylbenzylphthalate	660	µg/kg	200	U	400	UJ	NC	NC	190	U	890	UJ	NC	NC
Caprolactam	340	µg/kg	390	U	400	U	NC	NC	360	U	890	UJ	NC	NC
Carbazole	660	µg/kg	160	J	1000	J	NA	840	360	U	890	U	NC	NC
Chrysene	660	µg/kg	1800		7800	J	125	NA	230		890	UJ	NA	660
Dibenzo(a,h)anthracene	660	µg/kg	260		1300	J	NA	1040	190	U	400	J	NA	210
Dibenzofuran	340	µg/kg	260		1300	J	NA	1040	190	U	140	J	NA	50
Diethylphthalate	340	µg/kg	200	U	400	UJ	NC	NC	190	U	890	UJ	NC	NC
Dimethylphthalate	340	µg/kg	66	J	400	UJ	NA	334	89	J	890	UJ	NA	801
Di-n-butylphthalate	340	µg/kg	200	U	400	UJ	NC	NC	190	U	890	UJ	NC	NC
Di-n-octylphthalate	340	µg/kg	390	U	400	U	NC	NC	360	U	890	UJ	NC	NC
Fluoranthene	660	µg/kg	3300		14000	J	124	NA	300	J	890	U	NA	590
Fluorene	660	µg/kg	490		2800	J	NA	2310	190	U	470	J	NA	280
Hexachlorobenzene	340	µg/kg	200	U	110	UJ	NC	NC	190	U	890	UJ	NC	NC
Hexachlorobutadiene	340	µg/kg	200	U	150	UJ	NC	NC	190	U	250	UJ	NC	NC
Hexachlorocyclopentadiene	340	µg/kg	390	UJ	1200	U	NC	NC	360	UJ	340	UJ	NC	NC
Hexachloroethane	660	µg/kg	200	U	200	U	NC	NC	190	U	2590	U	NC	NC
Indeno(1,2,3-cd)pyrene	340	µg/kg	800		5700	J	NA	4900	130	J	430	U	NA	300
Isophorone	340	µg/kg	200	U	180	J	NA	20	190	U	400	J	NA	210
Naphthalene	340	µg/kg	130	J	1000	J	NA	870	190	U	890	UJ	NC	NC
Nitrobenzene	340	µg/kg	200	U	180	UJ	NC	NC	190	U	400	UJ	NC	NC
N-Nitroso-di-n-propylamine	340	µg/kg	200	U	100	UJ	NC	NC	190	U	230	UJ	NC	NC

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-SS-101-002-CDM		GS-SS-101-002-GEOSY		RPD	ABS	GS-SS-111-001-CDM		GS-SS-111-001-GEOSY		RPD	ABS
			12/4/2018		12/4/2018				12/4/2018		12/4/2018			
			GS-SS-101-002						GS-SS-111-001					
N-Nitrosodiphenylamine	340	µg/kg	200	U	90	UJ	NC	NC	190	U	210	UJ	NC	NC
Pentachlorophenol	660	µg/kg	390	U	270	U	NC	NC	360	U	600	U	NC	NC
Phenanthrene	340	µg/kg	3800		14000	J	115	NA	230		310	J	NA	80
Phenol	660	µg/kg	100	J	57	J	NA	43	100	J	890	U	NA	790
Pyrene	340	µg/kg	4800		15000	J	103	NA	380		460	J	NA	80

Notes:

1. Sample pairs with RPD or ABS outside of criteria in the table are highlighted in yellow
2. PRP's laboratory analyzed 1,4-dioxane as a volatile organic compound.

ABS = absolute difference

CRQL = contract required quantitation limit

mg/kg = milligram per kilogram

NA = not applicable

NC = not calculable

PCB = polychlorinated biphenyl

RPD = relative percent difference

SVOC = semivolatile organic compound

µg/kg = microgram per kilogram

Data Validation Qualifiers

J = The analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample.

J+ = The result is an estimated quantity, but the result may be biased high.

J- = The result is an estimated quantity, but the result may be biased low.

NJ = The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

R = The sample results are unusable due to poor data quality; certain criteria were not met. The analyte may or may not be present in the sample at the reported concentration.

U = The analyte was not detected at a level greater than or equal to the level of the sample CRQL.

UJ = The analyte was not detected; however, the reported CRQL is approximate and may be inaccurate or imprecise.

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-114-001-CDM		GS-B-114-001-GEOSY		RPD	ABS
			2/9/2019		2/9/2019			
			GS-B-114-001					
Metals								
Aluminum	40	mg/kg	3940		3950		0.25	NA
Antimony	2	mg/kg	5.7 J		31.2		138	NA
Arsenic	1	mg/kg	230		254		9.92	NA
Barium	10	mg/kg	260		144		57.4	NA
Beryllium	1	mg/kg	0.37 J		0.192 J		NA	0.18
Cadmium	1	mg/kg	46.4		22.1		70.9	NA
Calcium	1000	mg/kg	5680		5670		0.18	NA
Chromium	2	mg/kg	274		316		14.2	NA
Cobalt	1	mg/kg	11.2		8.84		23.6	NA
Copper	2	mg/kg	1400		1380		1.44	NA
Iron	20	mg/kg	20000		14700		30.5	NA
Lead	1	mg/kg	1360		1200		12.5	NA
Magnesium	1000	mg/kg	1260		1440		NA	180
Manganese	1	mg/kg	121		95.5		23.6	NA
Mercury	0	mg/kg	128		97.9		26.6	NA
Nickel	1	mg/kg	67.7		64.1		5.46	NA
Potassium	1000	mg/kg	636 U		552		NA	84
Selenium	5	mg/kg	4.5 UJ		2.08 J		NA	2.42
Silver	1	mg/kg	61		75.4		21.1	NA
Sodium	1000	mg/kg	636 U		319		NA	317
Thallium	1	mg/kg	1.4 J		2.74 U		NA	1.34
Vanadium	5	mg/kg	38.3		58.2		41.2	NA
Zinc	2	mg/kg	1510		1010		39.7	NA
Polychlorinated Biphenyl								
Aroclor 1016	66	µg/kg	52000		28390 U		58.7	NA
Aroclor 1221	66	µg/kg	560 U		28390 U		NC	NC
Aroclor 1232	66	µg/kg	560 U		28390 U		NC	NC
Aroclor 1242	66	µg/kg	560 U		348000 J		199	NA
Aroclor 1248	66	µg/kg	560 U		28390 U		NC	NC
Aroclor 1254	66	µg/kg	560 U		28390 U		NC	NC
Aroclor 1260	66	µg/kg	34000		131000 J		118	NA
Aroclor 1262	66	µg/kg	560 U		28390 U		NC	NC

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-114-001-CDM		GS-B-114-001-GEOSY		RPD	ABS
			2/9/2019		2/9/2019			
			GS-B-114-001					
Aroclor 1268	66	µg/kg	560	U	28390	U	NC	NC
Semivolatile Organic Compound								
1,1'-Biphenyl	340	µg/kg	1400	U	280	J	NA	1120
1,2,4,5-Tetrachlorobenzene	340	µg/kg	1400	U	540	J	NA	860
1,4-Dioxane ²	340	µg/kg	570	R	1400000	R	NC	NC
2,2'-Oxybis(1-chloropropane)	340	µg/kg	2800	U	1390	U	NC	NC
2,3,4,6-Tetrachlorophenol	134	µg/kg	1400	U	1100	U	NC	NC
2,4,5-Trichlorophenol	340	µg/kg	1400	U	1100	U	NC	NC
2,4,6-Trichlorophenol	340	µg/kg	1400	U	640	U	NC	NC
2,4-Dichlorophenol	340	µg/kg	1400	U	550	U	NC	NC
2,4-Dimethylphenol	340	µg/kg	1400	U	1100	U	NC	NC
2,4-Dinitrophenol	340	µg/kg	2800	U	1600	U	NC	NC
2,4-Dinitrotoluene	660	µg/kg	1400	U	560	U	NC	NC
2,6-Dinitrotoluene	340	µg/kg	1400	UJ	440	U	NC	NC
2-Chloronaphthalene	340	µg/kg	1400	U	1100	U	NC	NC
2-Chlorophenol	340	µg/kg	1400	U	370	U	NC	NC
2-Methylnaphthalene	340	µg/kg	570	J	1600		NA	1030
2-Methylphenol	340	µg/kg	2800	U	1100	U	NC	NC
2-Nitroaniline	660	µg/kg	1400	U	1100	U	NC	NC
2-Nitrophenol	340	µg/kg	1400	U	2500	U	NC	NC
3,3'-Dichlorobenzidine	340	µg/kg	2800	U	870	UJ	NC	NC
3-Nitroaniline	660	µg/kg	2800	UJ	1100	UJ	NC	NC
4,6-Dinitro-2-methylphenol	660	µg/kg	2800	U	1600	U	NC	NC
4-Bromophenyl-phenylether	660	µg/kg	1400	U	1100	U	NC	NC
4-Chloro-3-methylphenol	340	µg/kg	1400	U	1100	U	NC	NC
4-Chloroaniline	340	µg/kg	2800	U	1100	U	NC	NC
4-Chlorophenyl-phenylether	660	µg/kg	1400	U	1100	U	NC	NC
4-Methylphenol	340	µg/kg	2800	U			NC	NC
4-Nitroaniline	660	µg/kg	2800	U	1100	U	NC	NC
4-Nitrophenol	660	µg/kg	2800	U	1600	U	NC	NC
Acenaphthene	660	µg/kg	1400	U	500	J	NA	900
Acenaphthylene	340	µg/kg	1400	U	280	J	NA	1120

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-114-001-CDM		GS-B-114-001-GEOSY		RPD	ABS
			2/9/2019		2/9/2019			
			GS-B-114-001					
Acetophenone	340	µg/kg	2800	U	1100	U	NC	NC
Anthracene	660	µg/kg	14000		40000		96.3	NA
Atrazine	340	µg/kg	2800	U	910	U	NC	NC
Benzaldehyde	660	µg/kg	2800	U	1500	U	NC	NC
Benzo(a)anthracene	660	µg/kg	970	J	2100		NA	1130
Benzo(a)pyrene	340	µg/kg	610	J	1400		NA	790
Benzo(b)fluoranthene	340	µg/kg	1200	J	2700		76.9	NA
Benzo(g,h,i)perylene	340	µg/kg	470	J	1300		NA	830
Benzo(k)fluoranthene	340	µg/kg	400	J	870		NA	470
Bis(2-chloroethoxy)methane	340	µg/kg	1400	U	1200	U	NC	NC
Bis(2-chloroethyl)ether	340	µg/kg	2800	U	400	U	NC	NC
Bis(2-ethylhexyl)phthalate	340	µg/kg	9000		17000		61.5	NA
Butylbenzylphthalate	660	µg/kg	1400	U	1100	U	NC	NC
Caprolactam	340	µg/kg	2800	U	1100	U	NC	NC
Carbazole	660	µg/kg	2800	U	420	J	NA	2380
Chrysene	660	µg/kg	1200	J	2400		NA	1200
Dibenzo(a,h)anthracene	660	µg/kg	1400	U	450		NA	950
Dibenzofuran	340	µg/kg	1400	U	410	J	NA	990
Diethylphthalate	340	µg/kg	1400	U	1100	U	NC	NC
Dimethylphthalate	340	µg/kg	1400	U	1100	U	NC	NC
Di-n-butylphthalate	340	µg/kg	580	J	1600		NA	1020
Di-n-octylphthalate	340	µg/kg	680	J	1900		NA	1220
Fluoranthene	660	µg/kg	2300	J	5000		74	NA
Fluorene	660	µg/kg	340	J	790	J	NA	450
Hexachlorobenzene	340	µg/kg	1400	U	330	U	NC	NC
Hexachlorobutadiene	340	µg/kg	1400	U	410	UJ	NC	NC
Hexachlorocyclopentadiene	340	µg/kg	2800	U	3290	U	NC	NC
Hexachloroethane	660	µg/kg	1400	U	550	U	NC	NC
Indeno(1,2,3-cd)pyrene	340	µg/kg	440	J	1300		NA	860
Isophorone	340	µg/kg	1400	U	370	U	NC	NC
Naphthalene	340	µg/kg	3100		8800		95.8	NA
Nitrobenzene	340	µg/kg	1400	U	500	U	NC	NC
N-Nitroso-di-n-propylamine	340	µg/kg	1400	U	280	U	NC	NC

Table 3-1a
Soil Samples Data Comparison - Metals, PCBs, and SVOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-114-001-CDM		GS-B-114-001-GEOSY		RPD	ABS
			2/9/2019		2/9/2019			
			GS-B-114-001					
N-Nitrosodiphenylamine	340	µg/kg	1400	U	280	U	NC	NC
Pentachlorophenol	660	µg/kg	2800	U	750	U	NC	NC
Phenanthrene	340	µg/kg	1600		3700		79.2	NA
Phenol	660	µg/kg	2800	U	1100	U	NC	NC
Pyrene	340	µg/kg	1800		4200		80	NA

Notes:

1. Sample pairs with RPD or ABS outside of criteria in the table are highlighted in yellow
2. PRP's laboratory analyzed 1,4-dioxane as a volatile organic compound.

ABS = absolute difference

CRQL = contract required quantitation limit

mg/kg = milligram per kilogram

NA = not applicable

NC = not calculable

PCB = polychlorinated biphenyl

RPD = relative percent difference

SVOC = semivolatile organic compound

µg/kg = microgram per kilogram

Data Validation Qualifiers

J = The analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample.

J+ = The result is an estimated quantity, but the result may be biased high.

J- = The result is an estimated quantity, but the result may be biased low.

NJ = The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

R = The sample results are unusable due to poor data quality; certain criteria were not met. The analyte may or may not be present in the sample at the reported concentration.

U = The analyte was not detected at a level greater than or equal to the level of the sample CRQL.

UJ = The analyte was not detected; however, the reported CRQL is approximate and may be inaccurate or imprecise.

Table 3-1b
Soil Samples Data Comparison - VOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-101-004-CDM		GS-B-101-004-GEOSY		RPD	ABS	GS-B-102-004-CDM		GS-B-102-004-GEOSY		RPD	ABS
			12/14/2018		12/14/2018				12/17/2018		12/17/2018			
			GS-B-101-004						GS-B-102-004					
Volatile Organic Compound														
1,1,1-Trichloroethane	10	µg/kg	5	U	20	U	NC	NC	12	U	90	U	NC	NC
1,1,2,2-Tetrachloroethane	10	µg/kg	5	UJ	20	U	NC	NC	12	U	90	U	NC	NC
1,1,2-Trichloro-1,2,2-trifluoroethane	10	µg/kg	5	U	230	U	NC	NC	12	U	730	U	NC	NC
1,1,2-Trichloroethane	10	µg/kg	5	U	50	U	NC	NC	12	U	180	U	NC	NC
1,1-Dichloroethane	10	µg/kg	5	UJ	50	U	NC	NC	12	U	180	U	NC	NC
1,1-Dichloroethene	10	µg/kg	5	U	50	U	NC	NC	12	U	180	U	NC	NC
1,2,3-Trichlorobenzene	10	µg/kg	5	UJ	110	U	NC	NC	12	UJ	360	U	NC	NC
1,2,4-Trichlorobenzene	10	µg/kg	5	UJ	110	U	NC	NC	12	UJ	64	J	NA	52
1,2-Dibromo-3-chloropropane	10	µg/kg	5	UJ	180	U	NC	NC	12	UJ	540	U	NC	NC
1,2-Dibromoethane	10	µg/kg	5	U	50	U	NC	NC	12	U	180	U	NC	NC
1,2-Dichlorobenzene	10	µg/kg	4	J+	13	J	NA	9	12	UJ	360	U	NC	NC
1,2-Dichloroethane	10	µg/kg	5	U	50	U	NC	NC	12	U	180	U	NC	NC
1,2-Dichloropropane	10	µg/kg	5	U	50	U	NC	NC	12	U	180	U	NC	NC
1,3-Dichlorobenzene	10	µg/kg	5	UJ	110	U	NC	NC	12	UJ	360	U	NC	NC
1,4-Dichlorobenzene	10	µg/kg	2	J+	15	J	NA	13	12	UJ	80	J	NA	68
1,4-Dioxane ²	10	µg/kg			5900	R	NC	NC			18000	R	NC	NC
2-Butanone	20	µg/kg	6.6	J	580	U	NA	573	96		1790	U	180	NA
2-Hexanone	20	µg/kg	9.9	U	580	U	NC	NC	24	U	1790	U	NC	NC
4-Methyl-2-pentanone	20	µg/kg	9.9	U	580	U	NC	NC	24	U	1790	U	NC	NC
Acetone	20	µg/kg	65		580	U	160	NA	290		1790	U	144	NA
Benzene	10	µg/kg	210	J	1800		158	NA	31		580		180	NA
Bromochloromethane	10	µg/kg	5	UJ	110	U	NC	NC	12	U	360	U	NC	NC
Bromodichloromethane	10	µg/kg	5	U	20	U	NC	NC	12	U	90	U	NC	NC
Bromoform	10	µg/kg	5	UJ	230	U	NC	NC	12	UJ	730	U	NC	NC
Bromomethane	10	µg/kg	5	U	110	U	NC	NC	12	U	360	U	NC	NC
Carbon Disulfide	10	µg/kg	11		580	U	NA	569	12		1790	U	NA	1778
Carbon Tetrachloride	10	µg/kg	5	U	50	U	NC	NC	12	U	180	U	NC	NC
Chlorobenzene	10	µg/kg	4.3	J	40		NA	35.7	12	U	160		NA	148
Chloroethane	10	µg/kg	5	U	110	U	NC	NC	12	U	360	U	NC	NC
Chloroform	10	µg/kg	42	J-	80	U	62.3	NA	12	U	270	U	NC	NC
Chloromethane	10	µg/kg	5	U	230	U	NC	NC	12	U	730	U	NC	NC
cis-1,2-Dichloroethene	10	µg/kg	5	U	50	U	NC	NC	12	U	54	J	NA	42
cis-1,3-Dichloropropene	10	µg/kg	5	U	20	U	NC	NC	12	U	90	U	NC	NC
Cyclohexane	10	µg/kg	12	J+	69	J	NA	57	12	U	1790	U	NC	NC
Dibromochloromethane	10	µg/kg	5	UJ	50	U	NC	NC	12	U	180	U	NC	NC

Table 3-1b
Soil Samples Data Comparison - VOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-101-004-CDM	GS-B-101-004-GEOSY	RPD	ABS	GS-B-102-004-CDM	GS-B-102-004-GEOSY	RPD	ABS
			12/14/2018	12/14/2018			12/17/2018	12/17/2018		
			GS-B-101-004				GS-B-102-004			
Dichlorodifluoromethane	10	µg/kg	5 U	580 U	NC	NC	12 U	1790 U	NC	NC
Ethylbenzene	10	µg/kg	16	100	NA	84	4.9 J	150 J	NA	145
Isopropylbenzene	10	µg/kg	20	54 J	NA	34	9.7 J	200	NA	190
m,p-Xylene	10	µg/kg	8.7	74 J	NA	65.3	13	330 J	NA	317
Methyl acetate	10	µg/kg	5 U	1200	NA	1195	12 U	280 J	NA	268
Methyl tert-Butyl Ether	10	µg/kg	5 U	110 U	NC	NC	12 U	360 U	NC	NC
Methylcyclohexane	10	µg/kg	1.1 J+	230 U	NA	229	5.9 J+	120 J	NA	114
Methylene Chloride	10	µg/kg	10	280 U	NA	270	12 U	910 U	NC	NC
o-Xylene	10	µg/kg	24	69	NA	45	11 J	220	NA	209
Styrene	10	µg/kg	5 U	50 U	NC	NC	12 U	180 U	NC	NC
Tetrachloroethene	10	µg/kg	0.96 J	20 U	NA	19	12 U	90 U	NC	NC
Toluene	10	µg/kg	3 J	50 U	NA	47	9.9 J	230	NA	220
trans-1,2-Dichloroethene	10	µg/kg	5 U	80 U	NC	NC	12 U	270 U	NC	NC
trans-1,3-Dichloropropene	10	µg/kg	5 U	50 U	NC	NC	12 U	180 U	NC	NC
Trichloroethene	10	µg/kg	3.3 J	20 U	NA	16.7	12 U	110	NA	98
Trichlorofluoromethane	10	µg/kg	5 U	230 U	NC	NC	12 U	730 U	NC	NC
Vinyl Chloride	10	µg/kg	5 U	50 U	NC	NC	12 U	180 U	NC	NC

Notes:

1. Sample pairs with RPD or ABS outside of criteria in the table are highlighted in yellow
2. CDM Smith's assigned laboratory analyzed 1,4-dioxane as a semivolatile organic compound.

ABS = absolute difference

CRQL = contract required quantitation limit

mg/kg = milligram per kilogram

NA = not applicable

NC = not calculable

RPD = relative percent difference

µg/kg = microgram per kilogram

VOC = volatile organic compound

Data Validation Qualifiers

J = The analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample.

J+ = The result is an estimated quantity, but the result may be biased high.

J- = The result is an estimated quantity, but the result may be biased low.

NJ = The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

R = The sample results are unusable due to poor data quality; certain criteria were not met. The analyte may or may not be present in the sample at the reported concentration.

U = The analyte was not detected at a level greater than or equal to the level of the sample CRQL.

UJ = The analyte was not detected; however, the reported CRQL is approximate and may be inaccurate or imprecise.

Table 3-1b
Soil Samples Data Comparison - VOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-106-004-CDM		GS-B-106-004-GEOSY		RPD	ABS	GS-B-111-004-CDM		GS-B-111-004-GEOSY		RPD	ABS
			12/13/2018		12/13/2018				12/17/2018		12/17/2018			
			GS-B-106-004						GS-B-111-004					
Volatile Organic Compound														
1,1,1-Trichloroethane	10	µg/kg	470	U	2590	U	NC	NC	400	U	2000	U	NC	NC
1,1,2,2-Tetrachloroethane	10	µg/kg	470	U	2590	U	NC	NC	400	U	2000	U	NC	NC
1,1,2-Trichloro-1,2,2-trifluoroethane	10	µg/kg	470	U	21000	U	NC	NC	400	U	16000	U	NC	NC
1,1,2-Trichloroethane	10	µg/kg	470	U	5190	U	NC	NC	400	U	4090	U	NC	NC
1,1-Dichloroethane	10	µg/kg	470	U	5190	U	NC	NC	400	U	4090	U	NC	NC
1,1-Dichloroethene	10	µg/kg	470	U	5190	U	NC	NC	400	U	4090	U	NC	NC
1,2,3-Trichlorobenzene	10	µg/kg	470	U	10000	U	NC	NC	400	U	8190	U	NC	NC
1,2,4-Trichlorobenzene	10	µg/kg	470	U	10000	U	NC	NC	400	U	8190	U	NC	NC
1,2-Dibromo-3-chloropropane	10	µg/kg	470	U	16000	U	NC	NC	400	U	12000	U	NC	NC
1,2-Dibromoethane	10	µg/kg	470	U	5190	U	NC	NC	400	U	4090	U	NC	NC
1,2-Dichlorobenzene	10	µg/kg	470	U	10000	U	NC	NC	400	U	8190	U	NC	NC
1,2-Dichloroethane	10	µg/kg	470	U	5190	U	NC	NC	400	U	4090	U	NC	NC
1,2-Dichloropropane	10	µg/kg	470	U	5190	U	NC	NC	400	U	4090	U	NC	NC
1,3-Dichlorobenzene	10	µg/kg	470	U	10000	U	NC	NC	400	U	8190	U	NC	NC
1,4-Dichlorobenzene	10	µg/kg	470	U	10000	U	NC	NC	400	U	8190	U	NC	NC
1,4-Dioxane ²	10	µg/kg			520000	R	NC	NC			410000	R	NC	NC
2-Butanone	20	µg/kg	940	U	52000	U	NC	NC	800	U	41000	U	NC	NC
2-Hexanone	20	µg/kg	940	U	52000	U	NC	NC	800	U	41000	U	NC	NC
4-Methyl-2-pentanone	20	µg/kg	940	U	52000	U	NC	NC	800	U	41000	U	NC	NC
Acetone	20	µg/kg	940	U	52000	U	NC	NC	800	U	41000	U	NC	NC
Benzene	10	µg/kg	320	J	6100		180	NA	160	J	2000	U	170	NA
Bromochloromethane	10	µg/kg	470	U	10000	U	NC	NC	400	U	8190	U	NC	NC
Bromodichloromethane	10	µg/kg	470	U	2590	U	NC	NC	400	U	2000	U	NC	NC
Bromoform	10	µg/kg	470	U	21000	U	NC	NC	400	U	16000	U	NC	NC
Bromomethane	10	µg/kg	470	U	10000	U	NC	NC	400	U	8190	U	NC	NC
Carbon Disulfide	10	µg/kg	470	U	52000	U	NC	NC	400	U	41000	U	NC	NC
Carbon Tetrachloride	10	µg/kg	470	U	5190	U	NC	NC	400	U	4090	U	NC	NC
Chlorobenzene	10	µg/kg	120	J	1100	J	161	NA	400	U	2000	U	NC	NC
Chloroethane	10	µg/kg	470	U	10000	U	NC	NC	400	U	8190	U	NC	NC
Chloroform	10	µg/kg	470	U	7800	U	NC	NC	400	U	6090	U	NC	NC
Chloromethane	10	µg/kg	470	U	21000	U	NC	NC	400	U	16000	U	NC	NC
cis-1,2-Dichloroethene	10	µg/kg	470	U	5190	U	NC	NC	400	U	4090	U	NC	NC
cis-1,3-Dichloropropene	10	µg/kg	470	U	2590	U	NC	NC	400	U	2000	U	NC	NC
Cyclohexane	10	µg/kg	470	U	52000	U	NC	NC	400	U	41000	U	NC	NC
Dibromochloromethane	10	µg/kg	470	U	5190	U	NC	NC	400	U	4090	U	NC	NC

Table 3-1b
Soil Samples Data Comparison - VOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-106-004-CDM		GS-B-106-004-GEOSY		RPD	ABS	GS-B-111-004-CDM		GS-B-111-004-GEOSY		RPD	ABS
			12/13/2018		12/13/2018				12/17/2018		12/17/2018			
			GS-B-106-004						GS-B-111-004					
Dichlorodifluoromethane	10	µg/kg	470	U	52000	U	NC	NC	400	U	41000	U	NC	NC
Ethylbenzene	10	µg/kg	220	J	2000	J	160	NA	470000		380000		21.2	NA
Isopropylbenzene	10	µg/kg	10000		76000		153	NA	34000		41000		18.7	NA
m,p-Xylene	10	µg/kg	320	J	10000	U	188	NA	3100		7100	J	78.4	NA
Methyl acetate	10	µg/kg	470	U	21000	U	NC	NC	400	U	16000	U	NC	NC
Methyl tert-Butyl Ether	10	µg/kg	470	U	10000	U	NC	NC	400	U	8190	U	NC	NC
Methylcyclohexane	10	µg/kg	470	U	21000	U	NC	NC	400	U	16000	U	NC	NC
Methylene Chloride	10	µg/kg	470	U	26000	U	NC	NC	400	U	20000	U	NC	NC
o-Xylene	10	µg/kg	1600		13000		156	NA	13000		31000		81.8	NA
Styrene	10	µg/kg	470	U	5190	U	NC	NC	400	U	4090	U	NC	NC
Tetrachloroethene	10	µg/kg	470	U	2590	U	NC	NC	400	U	2000	U	NC	NC
Toluene	10	µg/kg	470	U	5190	U	NC	NC	400	U	4090	U	NC	NC
trans-1,2-Dichloroethene	10	µg/kg	470	U	7800	U	NC	NC	400	U	6090	U	NC	NC
trans-1,3-Dichloropropene	10	µg/kg	470	U	5190	U	NC	NC	400	U	4090	U	NC	NC
Trichloroethene	10	µg/kg	470	U	2590	U	NC	NC	400	U	2000	U	NC	NC
Trichlorofluoromethane	10	µg/kg	470	U	21000	U	NC	NC	400	U	16000	U	NC	NC
Vinyl Chloride	10	µg/kg	470	U	5190	U	NC	NC	400	U	4090	U	NC	NC

Notes:

- Sample pairs with RPD or ABS outside of criteria in the table are highlighted in yellow
- CDM Smith's assigned laboratory analyzed 1,4-dioxane as a semivolatile organic compound.

ABS = absolute difference

CRQL = contract required quantitation limit

mg/kg = milligram per kilogram

NA = not applicable

NC = not calculable

RPD = relative percent difference

µg/kg = microgram per kilogram

VOC = volatile organic compound

Data Validation Qualifiers

J = The analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample.

J+ = The result is an estimated quantity, but the result may be biased high.

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U = The analyte was not detected at a level greater than or equal to the level of the sample CRQL.

UJ = The analyte was not detected; however, the reported CRQL is approximate and may be inaccurate or imprecise.

Table 3-1b
Soil Samples Data Comparison - VOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-112-004-CDM		GS-B-112-004-GEOSY		RPD	ABS	GS-SS-101-003-CDM		GS-SS-101-003-GEOSY		RPD	ABS
			12/13/2018		12/13/2018				12/4/2018		12/4/2018			
			GS-B-112-004						GS-SS-101-003					
Volatile Organic Compound														
1,1,1-Trichloroethane	10	µg/kg	6 U		0.84 U		NC	NC	4.7 U		0.58 U		NC	NC
1,1,2,2-Tetrachloroethane	10	µg/kg	6 U		0.84 U		NC	NC	4.7 U		0.58 U		NC	NC
1,1,2-Trichloro-1,2,2-trifluoroethane	10	µg/kg	6 U		6.80 U		NC	NC	4.7 U		4.70 U		NC	NC
1,1,2-Trichloroethane	10	µg/kg	6 U		1.70 UJ		NC	NC	4.7 U		1.20 U		NC	NC
1,1-Dichloroethane	10	µg/kg	6 U		1.70 U		NC	NC	4.7 U		1.20 U		NC	NC
1,1-Dichloroethene	10	µg/kg	6 U		1.70 U		NC	NC	4.7 U		1.20 U		NC	NC
1,2,3-Trichlorobenzene	10	µg/kg	6 UJ		3.40 U		NC	NC	4.7 U		2.30 U		NC	NC
1,2,4-Trichlorobenzene	10	µg/kg	6 UJ		3.40 U		NC	NC	4.7 U		2.30 U		NC	NC
1,2-Dibromo-3-chloropropane	10	µg/kg	6 UJ		5.10 U		NC	NC	4.7 U		3.50 U		NC	NC
1,2-Dibromoethane	10	µg/kg	6 U		1.70 UJ		NC	NC	4.7 U		1.20 U		NC	NC
1,2-Dichlorobenzene	10	µg/kg	6 UJ		0.62 J		NA	5.38	4.7 U		2.30 U		NC	NC
1,2-Dichloroethane	10	µg/kg	6 U		1.70 U		NC	NC	4.7 U		1.20 U		NC	NC
1,2-Dichloropropane	10	µg/kg	6 U		1.70 U		NC	NC	4.7 U		1.20 U		NC	NC
1,3-Dichlorobenzene	10	µg/kg	6 UJ		3.40 U		NC	NC	4.7 U		2.30 U		NC	NC
1,4-Dichlorobenzene	10	µg/kg	6 UJ		3.40 U		NC	NC	4.7 U		2.30 U		NC	NC
1,4-Dioxane ²	10	µg/kg			170 R		NC	NC			110 R		NC	NC
2-Butanone	20	µg/kg	12 U		18		NA	6	9.4 U		10 U		NC	NC
2-Hexanone	20	µg/kg	12 U		10 UJ		NC	NC	9.4 U		10 U		NC	NC
4-Methyl-2-pentanone	20	µg/kg	12 U		10 UJ		NC	NC	9.4 U		10 U		NC	NC
Acetone	20	µg/kg	39		97		NA	58	24		17		NA	7
Benzene	10	µg/kg	6 U		0.59 J		NA	5.41	4.7 U		1.2		NA	3.5
Bromochloromethane	10	µg/kg	6 U		3.40 U		NC	NC	4.7 U		2.30 U		NC	NC
Bromodichloromethane	10	µg/kg	6 U		0.84 U		NC	NC	4.7 U		0.58 U		NC	NC
Bromoform	10	µg/kg	6 UJ		6.80 U		NC	NC	4.7 U		4.70 U		NC	NC
Bromomethane	10	µg/kg	6 U		3.40 U		NC	NC	4.7 U		2.30 U		NC	NC
Carbon Disulfide	10	µg/kg	6 U		10 U		NC	NC	1.8 J		10 U		NA	8.2
Carbon Tetrachloride	10	µg/kg	6 U		1.70 U		NC	NC	4.7 U		1.200 U		NC	NC
Chlorobenzene	10	µg/kg	6 U		0.84 UJ		NC	NC	4.7 U		0.580 U		NC	NC
Chloroethane	10	µg/kg	6 U		3.40 U		NC	NC	4.7 U		2.300 U		NC	NC
Chloroform	10	µg/kg	6 U		2.50 U		NC	NC	4.7 U		1.700 U		NC	NC
Chloromethane	10	µg/kg	6 U		6.80 U		NC	NC	4.7 U		4.700 U		NC	NC
cis-1,2-Dichloroethene	10	µg/kg	6 U		0.6 J		NA	5.4	4.7 U		1.200 U		NC	NC
cis-1,3-Dichloropropene	10	µg/kg	6 U		0.84 U		NC	NC	4.7 U		0.580 U		NC	NC
Cyclohexane	10	µg/kg	2.3 J		5.1 J		NA	2.8	4.7 U		10 U		NC	NC
Dibromochloromethane	10	µg/kg	6 U		1.70 UJ		NC	NC	4.7 U		1.20 U		NC	NC

Table 3-1b
Soil Samples Data Comparison - VOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-B-112-004-CDM		GS-B-112-004-GEOSY		RPD	ABS	GS-SS-101-003-CDM		GS-SS-101-003-GEOSY		RPD	ABS
			12/13/2018		12/13/2018				12/4/2018		12/4/2018			
			GS-B-112-004						GS-SS-101-003					
Dichlorodifluoromethane	10	µg/kg	6	U	10	U	NC	NC	4.7	U	10	U	NC	NC
Ethylbenzene	10	µg/kg	6	U	1.70	UJ	NC	NC	4.7	U	0.17	J	NA	4.53
Isopropylbenzene	10	µg/kg	6	U	2		NA	4	0.86	J	0.16	J	NA	0.7
m,p-Xylene	10	µg/kg	6	U	3.40	UJ	NC	NC	4.7	U	2.30	U	NC	NC
Methyl acetate	10	µg/kg	6	U	6.80	U	NC	NC	4.7	U	4.70	U	NC	NC
Methyl tert-Butyl Ether	10	µg/kg	6	U	0.39	J	NA	5.61	4.7	U	2.30	U	NC	NC
Methylcyclohexane	10	µg/kg	6	U	3.2	J	NA	2.8	4.7	U	4.70	U	NC	NC
Methylene Chloride	10	µg/kg	6	U	8.40	U	NC	NC	3	J	5.80	U	NA	2.8
o-Xylene	10	µg/kg	6	U	0.62	J	NA	5.38	4.7	U	1.20	U	NC	NC
Styrene	10	µg/kg	6	U	1.70	UJ	NC	NC	4.7	U	1.20	U	NC	NC
Tetrachloroethene	10	µg/kg	6	U	0.84	UJ	NC	NC	4.7	U	0.32	J	NA	4.38
Toluene	10	µg/kg	6	U	1.70	UJ	NC	NC	4.7	U	1.20	U	NC	NC
trans-1,2-Dichloroethene	10	µg/kg	6	U	2.50	U	NC	NC	4.7	U	1.70	U	NC	NC
trans-1,3-Dichloropropene	10	µg/kg	6	U	1.70	UJ	NC	NC	4.7	U	1.20	U	NC	NC
Trichloroethene	10	µg/kg	6	U	0.84	U	NC	NC	4.7	U	0.39	J	NA	4.31
Trichlorofluoromethane	10	µg/kg	6	U	6.80	U	NC	NC	4.7	U	4.70	U	NC	NC
Vinyl Chloride	10	µg/kg	6	U	1.70	U	NC	NC	4.7	U	1.20	U	NC	NC

Notes:

- Sample pairs with RPD or ABS outside of criteria in the table are highlighted in yellow
- CDM Smith's assigned laboratory analyzed 1,4-dioxane as a semivolatile organic compound.

ABS = absolute difference

CRQL = contract required quantitation limit

mg/kg = milligram per kilogram

NA = not applicable

NC = not calculable

RPD = relative percent difference

µg/kg = microgram per kilogram

VOC = volatile organic compound

Data Validation Qualifiers

J = The analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample.

J+ = The result is an estimated quantity, but the result may be biased high.

J- = The result is an estimated quantity, but the result may be biased low.

NJ = The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

R = The sample results are unusable due to poor data quality; certain criteria were not met. The analyte may or may not be present in the sample at the reported concentration.

U = The analyte was not detected at a level greater than or equal to the level of the sample CRQL.

UJ = The analyte was not detected; however, the reported CRQL is approximate and may be inaccurate or imprecise.

Table 3-1b
Soil Samples Data Comparison - VOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-SS-111-003-CDM		GS-SS-111-003-GEOSY		RPD	ABS	GS-B-114-001-CDM		GS-B-114-001-GEOSY		RPD	ABS
			12/4/2018		12/4/2018				2/9/2019		2/9/2019			
			GS-SS-111-003						GS-B-114-001					
Volatile Organic Compound														
1,1,1-Trichloroethane	10	µg/kg	270	U	50.00	U	NC	NC	7400	J	7200		2.74	NA
1,1,2,2-Tetrachloroethane	10	µg/kg	270	U	50.00	U	NC	NC	12000	U	6800	U	NC	NC
1,1,2-Trichloro-1,2,2-trifluoroethane	10	µg/kg	270	U	400.00	U	NC	NC	12000	U	54000	U	NC	NC
1,1,2-Trichloroethane	10	µg/kg	270	U	100.00	U	NC	NC	12000	U	14000	U	NC	NC
1,1-Dichloroethane	10	µg/kg	270	U	100.00	U	NC	NC	3800	J	3700	J	2.67	NA
1,1-Dichloroethene	10	µg/kg	270	U	100.00	U	NC	NC	12000	U	14000	U	NC	NC
1,2,3-Trichlorobenzene	10	µg/kg	270	U	200.00	U	NC	NC	2600	J	27000	U	165	NA
1,2,4-Trichlorobenzene	10	µg/kg	140	J	200.00	U	35.3	NA	7000	J	11000	J	44.4	NA
1,2-Dibromo-3-chloropropane	10	µg/kg	270	U	300.00	U	NC	NC	12000	U	41000	U	NC	NC
1,2-Dibromoethane	10	µg/kg	270	U	100.00	U	NC	NC	12000	U	14000	U	NC	NC
1,2-Dichlorobenzene	10	µg/kg	2000		1600.00		22.2	NA	10000	J	17000	J	51.9	NA
1,2-Dichloroethane	10	µg/kg	270	U	100.00	U	NC	NC	12000	U	14000	U	NC	NC
1,2-Dichloropropane	10	µg/kg	270	U	100.00	U	NC	NC	12000	U	14000	U	NC	NC
1,3-Dichlorobenzene	10	µg/kg	610		560.00		8.55	NA	3900	J	5700	J	37.5	NA
1,4-Dichlorobenzene	10	µg/kg	2400		2300.00		4.26	NA	13000		22000	J	51.4	NA
1,4-Dioxane ²	10	µg/kg			10000	R	NC	NC						
2-Butanone	20	µg/kg	540	U	1000	U	NC	NC	25000	U	140000	U	NC	NC
2-Hexanone	20	µg/kg	540	U	1000	U	NC	NC	25000	U	140000	U	NC	NC
4-Methyl-2-pentanone	20	µg/kg	540	U	1000	U	NC	NC	25000	U	140000	U	NC	NC
Acetone	20	µg/kg	540	U	1000	U	NC	NC	25000	U	140000	U	NC	NC
Benzene	10	µg/kg	270	U	77		111	NA	12000	U	6800	U	NC	NC
Bromochloromethane	10	µg/kg	270	U	200.00	U	NC	NC	12000	U	27000	U	NC	NC
Bromodichloromethane	10	µg/kg	270	U	50.00	U	NC	NC	12000	U	6800	U	NC	NC
Bromoform	10	µg/kg	270	U	400.00	U	NC	NC	12000	U	54000	U	NC	NC
Bromomethane	10	µg/kg	270	U	200.00	U	NC	NC	12000	U	27000	U	NC	NC
Carbon Disulfide	10	µg/kg	270	U	1000	U	NC	NC	12000	U	140000	U	NC	NC
Carbon Tetrachloride	10	µg/kg	270	U	100.000	U	NC	NC	12000	U	14000	U	NC	NC
Chlorobenzene	10	µg/kg	16000		19000.000		17.1	NA	23000		36000		44.1	NA
Chloroethane	10	µg/kg	270	U	200.000	U	NC	NC	12000	U	27000	U	NC	NC
Chloroform	10	µg/kg	270	U	150.000	U	NC	NC	9600	J	20000	U	70.3	NA
Chloromethane	10	µg/kg	270	U	400.000	U	NC	NC	12000	U	54000	U	NC	NC
cis-1,2-Dichloroethene	10	µg/kg	270	U	100.000	U	NC	NC	260000		230000		12.2	NA
cis-1,3-Dichloropropene	10	µg/kg	270	U	50.000	U	NC	NC	12000	U	6800	U	NC	NC
Cyclohexane	10	µg/kg	270	U	1000	U	NC	NC	12000	U	140000	U	NC	NC
Dibromochloromethane	10	µg/kg	270	U	100.00	U	NC	NC	12000	U	14000	U	NC	NC

Table 3-1b
Soil Samples Data Comparison - VOCs
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	GS-SS-111-003-CDM		GS-SS-111-003-GEOSY		RPD	ABS	GS-B-114-001-CDM		GS-B-114-001-GEOSY		RPD	ABS
			12/4/2018		12/4/2018				2/9/2019		2/9/2019			
			GS-SS-111-003						GS-B-114-001					
Dichlorodifluoromethane	10	µg/kg	270	U	1000	U	NC	NC	12000	U	140000	U	NC	NC
Ethylbenzene	10	µg/kg	270	U	100	U	NC	NC	13000		19000		37.5	NA
Isopropylbenzene	10	µg/kg	270	U	100	U	NC	NC	12000	U	2300	J	136	NA
m,p-Xylene	10	µg/kg	270	U	200.00	U	NC	NC	29000		40000		31.9	NA
Methyl acetate	10	µg/kg	270	U	1500.00		139	NA	12000	U	54000	U	NC	NC
Methyl tert-Butyl Ether	10	µg/kg	270	U	200.00	U	NC	NC	12000	U	27000	U	NC	NC
Methylcyclohexane	10	µg/kg	270	U	400.00	U	NC	NC	12000	U	54000	U	NC	NC
Methylene Chloride	10	µg/kg	270	U	500.00	U	NC	NC	12000	U	68000	U	NC	NC
o-Xylene	10	µg/kg	270	U	100.00	U	NC	NC	9300	J	14000		40.3	NA
Styrene	10	µg/kg	270	U	100.00	U	NC	NC	12000	U	14000	U	NC	NC
Tetrachloroethene	10	µg/kg	270	U	50	U	NC	NC	1200000		2100000		54.5	NA
Toluene	10	µg/kg	270	U	100.00	U	NC	NC	3400	J	14000	U	122	NA
trans-1,2-Dichloroethene	10	µg/kg	270	U	150.00	U	NC	NC	12000	U	20000	U	NC	NC
trans-1,3-Dichloropropene	10	µg/kg	270	U	100.00	U	NC	NC	12000	U	14000	U	NC	NC
Trichloroethene	10	µg/kg	270	U	50	U	NC	NC	55000		66000		18.2	NA
Trichlorofluoromethane	10	µg/kg	270	U	400.00	U	NC	NC	12000	U	54000	U	NC	NC
Vinyl Chloride	10	µg/kg	270	U	100.00	U	NC	NC	5900	J	5600	J	5.22	NA

Notes:

- Sample pairs with RPD or ABS outside of criteria in the table are highlighted in yellow
- CDM Smith's assigned laboratory analyzed 1,4-dioxane as a semivolatile organic compound.

ABS = absolute difference

CRQL = contract required quantitation limit

mg/kg = milligram per kilogram

NA = not applicable

NC = not calculable

RPD = relative percent difference

µg/kg = microgram per kilogram

VOC = volatile organic compound

Data Validation Qualifiers

J = The analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample.

J+ = The result is an estimated quantity, but the result may be biased high.

J- = The result is an estimated quantity, but the result may be biased low.

NJ = The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

R = The sample results are unusable due to poor data quality; certain criteria were not met. The analyte may or may not be present in the sample at the reported concentration.

U = The analyte was not detected at a level greater than or equal to the level of the sample CRQL.

UJ = The analyte was not detected; however, the reported CRQL is approximate and may be inaccurate or imprecise.

Table 3-2
Groundwater Samples Data Comparison
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	MW-10-CDM		MW-10-GEOSY		RPD	ABS	MW-17-CDM		MW-17-GEOSY		RPD	ABS
			12/20/2018		12/19/2018				12/27/2018		12/27/2018			
			MW-10-181220						MW-17					
Metals														
Aluminum	40	µg/L	39.4	J	10	U	NA	29.4	80.8		10	U	NA	70.8
Antimony	4	µg/L	2	U	4	U	NC	NC	2	U	4	J	NA	2
Arsenic	2	µg/L	68.7		20.77		107	NA	246		134.5		58.6	NA
Barium	20	µg/L	991		934.5		5.87	NA	750		782.4		4.23	NA
Beryllium	2	µg/L	1	U	0.5	U	NC	NC	1	U	0.5	U	NC	NC
Cadmium	2	µg/L	1	U	0.2	U	NC	NC	4.1		3.376		NA	0.72
Calcium	1000	µg/L	107000		105000		1.89	NA	111000		105000		5.56	NA
Chromium	4	µg/L	0.33	J	0.2051	J	NA	0.12	1		0.6716	J	NA	0.33
Cobalt	2	µg/L	1	U	0.3671	J	NA	0.63	950		829.6		13.5	NA
Copper	4	µg/L	2	U	1	J	NA	1	2.7		1.417		NA	1.28
Iron	400	µg/L	10500		592		NA	9908	9660		4430		74.2	NA
Lead	2	µg/L	0.5	U	1	U	NC	NC	22.2		4.667		NA	17.5
Magnesium	1000	µg/L	13900		12700		9.02	NA	18100		15300		16.8	NA
Manganese	2	µg/L	393		371.5		5.62	NA	1060		991.6		6.67	NA
Mercury	0.4	µg/L	0.05	UJ	0.2	U	NC	NC	54.2		6.195		159	NA
Nickel	2	µg/L	7		6.555		6.57	NA	8.5		6.798		22.3	NA
Potassium	1000	µg/L	20900		20100		3.9	NA	65500		59600		9.43	NA
Selenium	10	µg/L	3.5	J	5	U	NA	1.5	8.9		5	U	NA	3.9
Silver	2	µg/L	1	U	0.4	U	NC	NC	1	U	0.4	U	NC	NC
Sodium	1000	µg/L	250000		257000		2.76	NA	255000		239000		6.48	NA
Thallium	2	µg/L	1	U	0.5	U	NC	NC	1	U	0.2564	J	NA	0.74
Vanadium	10	µg/L	0.43	J	5	U	NA	4.57	1.4	J	5	U	NA	3.6
Zinc	4	µg/L	46.5		4.866	J	NA	41.6	880		577.5		41.5	NA
Polychlorinated Biphenyl														
Aroclor 1016	2	µg/L	1	U	0.25	U	NC	NC	1	U	0.25	U	NC	NC
Aroclor 1221	2	µg/L	1	U	0.25	U	NC	NC	1	U	0.25	U	NC	NC
Aroclor 1232	2	µg/L	1	U	0.25	U	NC	NC	1	U	0.25	U	NC	NC
Aroclor 1242	2	µg/L	1	U	0.25	U	NC	NC	1	U	0.25	U	NC	NC
Aroclor 1248	2	µg/L	1	U	0.25	U	NC	NC	1	U	0.25	U	NC	NC
Aroclor 1254	2	µg/L	1	U	0.25	U	NC	NC	1	U	0.25	U	NC	NC
Aroclor 1260	2	µg/L	1	U	0.25	U	NC	NC	1	U	0.25	U	NC	NC
Aroclor 1262	2	µg/L	1	U	0.25	U	NC	NC	1	U	0.25	U	NC	NC

Table 3-2
Groundwater Samples Data Comparison
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	MW-10-CDM		MW-10-GEOSY		RPD	ABS	MW-17-CDM		MW-17-GEOSY		RPD	ABS
			12/20/2018		12/19/2018				12/27/2018		12/27/2018			
			MW-10-181220						MW-17					
Aroclor 1268	2	µg/L	1 U		0.25 U		NC	NC	1 U		0.25 U		NC	NC
Pesticides														
4,4'-DDD	0.2	µg/L	0.1 U		0.02 U		NC	NC	0.1 U		0.02 U		NC	NC
4,4'-DDE	0.2	µg/L	0.1 U		0.02 U		NC	NC	0.1 U		0.02 U		NC	NC
4,4'-DDT	0.2	µg/L	0.1 U		0.02 U		NC	NC	0.1 U		0.02 U		NC	NC
Aldrin	0.1	µg/L	0.05 U		0.01 U		NC	NC	0.05 U		0.01 U		NC	NC
alpha-BHC	0.1	µg/L	0.05 U		0.01 U		NC	NC	0.05 U		0.01 U		NC	NC
alpha-Chlordane	0.1	µg/L	0.05 U		0.01 U		NC	NC	0.05 U		0.01 U		NC	NC
beta-BHC	0.1	µg/L	0.05 U		0.01 U		NC	NC	0.05 U		0.01 U		NC	NC
delta-BHC	0.1	µg/L	0.05 U		0.01 U		NC	NC	0.05 U		0.21		NA	0.16
Dieldrin	0.1	µg/L	0.1 U		0.02 U		NC	NC	0.1 U		0.02 U		NC	NC
Endosulfan I	0.2	µg/L	0.05 U		0.01 U		NC	NC	0.05 U		0.01 U		NC	NC
Endosulfan II	0.1	µg/L	0.1 U		0.02 U		NC	NC	0.1 U		0.02 U		NC	NC
Endosulfan Sulfate	0.2	µg/L	0.1 U		0.02 U		NC	NC	0.1 U		0.02 U		NC	NC
Endrin	0.2	µg/L	0.1 U		0.02 U		NC	NC	0.1 U		0.02 U		NC	NC
Endrin aldehyde	0.2	µg/L	0.1 U		0.02 U		NC	NC	0.1 U		0.02 U		NC	NC
Endrin Ketone	0.2	µg/L	0.1 U		0.02 U		NC	NC	0.1 U		0.02 U		NC	NC
gamma-BHC (Lindane)	0.2	µg/L	0.05 U	U	0.01 U		NC	NC	0.05 U		0.01 U		NC	NC
gamma-Chlordane	0.1	µg/L	0.05 U		0.01 U		NC	NC	0.05 U		0.01 U		NC	NC
Heptachlor	0.1	µg/L	0.05 U		0.01 U		NC	NC	0.05 U		0.01 U		NC	NC
Heptachlor Epoxide	0.1	µg/L	0.05 U		0.01 U		NC	NC	0.05 U		0.01 U		NC	NC
Methoxychlor	1	µg/L	0.5 U		0.14 U		NC	NC	0.5 U		0.14 U		NC	NC
Toxaphene	10	µg/L	5 U		0.14 U		NC	NC	5 U		0.14 U		NC	NC
Semivolatile Organic Compound														
1,1'-Biphenyl	10	µg/L	5 U		2 U	U	NC	NC	5 U		2 U	U	NC	NC
1,2,4,5-Tetrachlorobenzene	10	µg/L	5 U		10 U	U	NC	NC	5 U		10 U	U	NC	NC
1,4-Dioxane ²	4	µg/L	2 U		250	R	NC	NC	2 U	U	500	R	NC	NC
2,2'-Oxybis(1-chloropropane)	20	µg/L	10 U		2 U	U	NC	NC	10 U		2 U	U	NC	NC
2,3,4,6-Tetrachlorophenol	10	µg/L	5 U		5 U	U	NC	NC	5 U		5 U	U	NC	NC
2,4,5-Trichlorophenol	10	µg/L	5 U		5 U	U	NC	NC	5 U		5 U	U	NC	NC
2,4,6-Trichlorophenol	10	µg/L	5 U		5 U	U	NC	NC	5 U		5 U	U	NC	NC
2,4-Dichlorophenol	10	µg/L	5 U		5 U	U	NC	NC	5 U		5 U	U	NC	NC

Table 3-2
Groundwater Samples Data Comparison
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	MW-10-CDM	MW-10-GEOSY	RPD	ABS	MW-17-CDM	MW-17-GEOSY	RPD	ABS
			12/20/2018	12/19/2018			12/27/2018	12/27/2018		
			MW-10-181220				MW-17			
2,4-Dimethylphenol	10	µg/L	5 U	5 UJ	NC	NC	5 U	5 U	NC	NC
2,4-Dinitrophenol	20	µg/L	10 U	20 U	NC	NC	10 U	20 U	NC	NC
2,4-Dinitrotoluene	10	µg/L	5 U	5 UJ	NC	NC	5 U	5 U	NC	NC
2,6-Dinitrotoluene	10	µg/L	5 U	5 UJ	NC	NC	5 U	5 U	NC	NC
2-Chloronaphthalene	10	µg/L	5 U	2 UJ	NC	NC	5 U	2 U	NC	NC
2-Chlorophenol	10	µg/L	5 U	2 UJ	NC	NC	5 U	2 U	NC	NC
2-Methylnaphthalene	10	µg/L	5 U	2 UJ	NC	NC	5 U	2 U	NC	NC
2-Methylphenol	20	µg/L	10 U	5 UJ	NC	NC	10 U	5 U	NC	NC
2-Nitroaniline	10	µg/L	5 U	5 UJ	NC	NC	5 U	5 UJ	NC	NC
2-Nitrophenol	10	µg/L	5 U	10 UJ	NC	NC	5 U	10 U	NC	NC
3,3'-Dichlorobenzidine	20	µg/L	10 U	5 UJ	NC	NC	10 U	5 U	NC	NC
3-Nitroaniline	20	µg/L	10 U	5 UJ	NC	NC	10 U	5 UJ	NC	NC
4,6-Dinitro-2-methylphenol	20	µg/L	10 U	0.69 UJ	NC	NC	10 U	0.69 UJ	NC	NC
4-Bromophenyl-phenylether	10	µg/L	5 U	2 UJ	NC	NC	5 U	2 U	NC	NC
4-Chloro-3-methylphenol	10	µg/L	5 U	2 UJ	NC	NC	5 U	2 U	NC	NC
4-Chloroaniline	20	µg/L	10 U	5 U	NC	NC	10 U	5 U	NC	NC
4-Chlorophenyl-phenylether	10	µg/L	5 U	2 UJ	NC	NC	5 U	2 U	NC	NC
4-Methylphenol	20	µg/L	10 U		NC	NC	10 U		NC	NC
4-Nitroaniline	20	µg/L	10 U	5 UJ	NC	NC	10 U	5 UJ	NC	NC
4-Nitrophenol	20	µg/L	10 U	10 U	NC	NC	10 U	10 U	NC	NC
Acenaphthene	10	µg/L	5 U	2 UJ	NC	NC	5 U	2 UJ	NC	NC
Acenaphthylene	10	µg/L	5 U	2 UJ	NC	NC	5 U	2 U	NC	NC
Acetophenone	20	µg/L	10 U	5 UJ	NC	NC	10 U	5 U	NC	NC
Anthracene	10	µg/L	5 U	2 UJ	NC	NC	5 U	2 U	NC	NC
Atrazine	20	µg/L	10 U	3 UJ	NC	NC	10 U	3 U	NC	NC
Benzaldehyde	20	µg/L	10 U	5 U	NC	NC	10 U	5 U	NC	NC
Benzo(a)anthracene	10	µg/L	5 U	0.1 UJ	NC	NC	5 U	0.1 UJ	NC	NC
Benzo(a)pyrene	10	µg/L	5 U	0.1 UJ	NC	NC	5 U	0.1 UJ	NC	NC
Benzo(b)fluoranthene	10	µg/L	5 U	0.1 UJ	NC	NC	5 U	0.1 UJ	NC	NC
Benzo(g,h,i)perylene	10	µg/L	5 U	2 UJ	NC	NC	5 U	2 U	NC	NC
Benzo(k)fluoranthene	10	µg/L	5 U	0.1 UJ	NC	NC	5 U	0.1 UJ	NC	NC
Bis(2-chloroethoxy)methane	10	µg/L	5 U	5 UJ	NC	NC	5 U	5 U	NC	NC
Bis(2-chloroethyl)ether	20	µg/L	10 U	2 UJ	NC	NC	10 U	2 U	NC	NC

Table 3-2
Groundwater Samples Data Comparison
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	MW-10-CDM	MW-10-GEOSY	RPD	ABS	MW-17-CDM	MW-17-GEOSY	RPD	ABS
			12/20/2018	12/19/2018			12/27/2018	12/27/2018		
			MW-10-181220				MW-17			
Bis(2-ethylhexyl)phthalate	10	µg/L	5 U	3 UJ	NC	NC	5 U	3 U	NC	NC
Butylbenzylphthalate	10	µg/L	5 U	5 UJ	NC	NC	5 U	5 UJ	NC	NC
Caprolactam	20	µg/L	10 U	10 U	NC	NC	10 U	10 U	NC	NC
Carbazole	20	µg/L	10 U	2 UJ	NC	NC	10 U	2 U	NC	NC
Chrysene	10	µg/L	5 U	2 UJ	NC	NC	5 U	2 U	NC	NC
Dibenzo(a,h)anthracene	10	µg/L	5 U	0.1 UJ	NC	NC	5 U	0.1 UJ	NC	NC
Dibenzofuran	10	µg/L	5 U	2 UJ	NC	NC	5 U	2 UJ	NC	NC
Diethylphthalate	10	µg/L	5 U	5 UJ	NC	NC	5 U	5 UJ	NC	NC
Dimethylphthalate	10	µg/L	5.5	5 UJ	NA	0.5	5 U	5 U	NC	NC
Di-n-butylphthalate	10	µg/L	5 U	5 UJ	NC	NC	5 U	5 UJ	NC	NC
Di-n-octylphthalate	20	µg/L	10 U	5 UJ	NC	NC	10 U	5 UJ	NC	NC
Fluoranthene	20	µg/L	10 U	2 UJ	NC	NC	10 U	2 U	NC	NC
Fluorene	10	µg/L	5 U	2 UJ	NC	NC	5 U	2 UJ	NC	NC
Hexachlorobenzene	10	µg/L	5 U	0.01 UJ	NC	NC	5 U	0.01 UJ	NC	NC
Hexachlorobutadiene	10	µg/L	5 U	1 UJ	NC	NC	5 U	1 U	NC	NC
Hexachlorocyclopentadiene	20	µg/L	10 U	20 U	NC	NC	10 U	20 U	NC	NC
Hexachloroethane	10	µg/L	5 U	2 U	NC	NC	5 U	2 U	NC	NC
Indeno(1,2,3-cd)pyrene	10	µg/L	5 U	0.1 UJ	NC	NC	5 U	0.1 UJ	NC	NC
Isophorone	10	µg/L	5 U	5 UJ	NC	NC	5 U	5 U	NC	NC
Naphthalene	10	µg/L	5 U	2 UJ	NC	NC	5 U	2 UJ	NC	NC
Nitrobenzene	10	µg/L	5 U	2 UJ	NC	NC	5 U	2 U	NC	NC
N-Nitroso-di-n-propylamine	10	µg/L	5 U	5 UJ	NC	NC	5 U	5 U	NC	NC
N-Nitrosodiphenylamine	10	µg/L	5 U	2 UJ	NC	NC	5 U	2 UJ	NC	NC
Pentachlorophenol	20	µg/L	10 U	0.3 J	NA	9.7	10 U	0.48	NA	9.52
Phenanthrene	10	µg/L	5 U	2 UJ	NC	NC	5 U	2 UJ	NC	NC
Phenol	20	µg/L	1.9 J	5 U	NA	3.1	10 U	0.61 J	NA	9.39
Pyrene	10	µg/L	5 U	2 UJ	NC	NC	5 U	2 UJ	NC	NC
Volatile Organic Compound										
1,1,1-Trichloroethane	1	µg/L	0.5 U	0.5 U	NC	NC	0.5 U	1 U	NC	NC
1,1,2,2-Tetrachloroethane	1	µg/L	0.5 U	0.5 U	NC	NC	0.5 U	1 U	NC	NC
1,1,2-Trichloro-1,2,2-trifluoroethane	1	µg/L	0.5 U	2.5 U	NC	NC	0.5 U	5 U	NC	NC
1,1,2-Trichloroethane	1	µg/L	0.5 U	0.75 U	NC	NC	0.5 U	1.5 U	NC	NC
1,1-Dichloroethane	1	µg/L	1.2	0.99	NA	0.21	1.4	1.3 J	NA	0.1

Table 3-2
Groundwater Samples Data Comparison
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	MW-10-CDM	MW-10-GEOSY	RPD	ABS	MW-17-CDM	MW-17-GEOSY	RPD	ABS
			12/20/2018	12/19/2018			12/27/2018	12/27/2018		
			MW-10-181220				MW-17			
1,1-Dichloroethene	1	µg/L	0.5 U	0.5 U	NC	NC	0.5 U	1 U	NC	NC
1,2,3-Trichlorobenzene	1	µg/L	0.5 U	2.5 U	NC	NC	0.5 U	5 U	NC	NC
1,2,4-Trichlorobenzene	1	µg/L	0.5 U	2.5 U	NC	NC	0.5 U	5 U	NC	NC
1,2-Dibromo-3-chloropropane	1	µg/L	0.5 U	2.5 U	NC	NC	0.5 U	5 U	NC	NC
1,2-Dibromoethane	1	µg/L	0.5 U	2 U	NC	NC	0.5 U	4 U	NC	NC
1,2-Dichlorobenzene	1	µg/L	0.39 J	0.33 J	NA	0.06	0.35 J	5 U	NA	4.65
1,2-Dichloroethane	1	µg/L	0.5 U	0.5 U	NC	NC	0.5 U	0.37 J	NA	0.13
1,2-Dichloropropane	1	µg/L	0.5 U	1 U	NC	NC	0.5 U	2 U	NC	NC
1,3-Dichlorobenzene	1	µg/L	0.5 U	2.5 U	NC	NC	0.5 U	5 U	NC	NC
1,4-Dichlorobenzene	1	µg/L	0.5 U	2.5 U	NC	NC	0.5 U	5 U	NC	NC
1,4-Dioxane	4	µg/L		250 R	NC	NC		500 R	NC	NC
2-Butanone	10	µg/L	5 U	5 U	NC	NC	5 U	10 U	NC	NC
2-Hexanone	10	µg/L	5 U	5 U	NC	NC	5 U	10 U	NC	NC
4-Methyl-2-pentanone	10	µg/L	5 U	5 U	NC	NC	5 U	10 U	NC	NC
Acetone	10	µg/L	5 U	5 U	NC	NC	5 U	10 J	NA	5
Benzene	1	µg/L	6.5	5.8	11.4	NA	300	310	3.28	NA
Bromochloromethane	1	µg/L	0.5 U	2.5 U	NC	NC	0.5 U	5 U	NC	NC
Bromodichloromethane	1	µg/L	0.5 U	0.5 U	NC	NC	0.5 U	1 U	NC	NC
Bromoform	1	µg/L	0.5 U	2 U	NC	NC	0.5 U	4 U	NC	NC
Bromomethane	1	µg/L	0.5 U	1 U	NC	NC	0.5 U	2 U	NC	NC
Carbon Disulfide	1	µg/L	0.5 U	5 U	NC	NC	0.5 U	10 U	NC	NC
Carbon Tetrachloride	1	µg/L	0.5 U	0.5 U	NC	NC	0.5 U	1 U	NC	NC
Chlorobenzene	1	µg/L	0.29 J	0.34 J	NA	0.05	2.1	2.1	NA	0
Chloroethane	1	µg/L	0.77	0.77 J	NA	0	200	250	22.2	NA
Chloroform	1	µg/L	0.5 U	0.75 U	NC	NC	0.5 U	1.5 U	NC	NC
Chloromethane	1	µg/L	0.5 U	2.5 U	NC	NC	0.5 U	5 U	NC	NC
cis-1,2-Dichloroethene	1	µg/L	0.5 U	0.5 U	NC	NC	0.83	0.74 J	NA	0.09
cis-1,3-Dichloropropene	1	µg/L	0.5 U	0.5 U	NC	NC	0.5 U	1 U	NC	NC
Cyclohexane	1	µg/L	1.6	1.4 J	NA	0.2	0.42 J	20 U	NA	19.6
Dibromochloromethane	1	µg/L	0.5 U	0.5 U	NC	NC	0.5 U	1 U	NC	NC
Dichlorodifluoromethane	1	µg/L	0.5 U	5 U	NC	NC	0.5 U	10 U	NC	NC
Ethylbenzene	1	µg/L	0.33 J	0.28 J	NA	0.05	1	0.92 J	NA	0.08
Isopropylbenzene	1	µg/L	56	50	11.3	NA	8.5	6.3	29.7	NA

Table 3-2
Groundwater Samples Data Comparison
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical Name	2 x CRQL	Unit	MW-10-CDM		MW-10-GEOSY		RPD	ABS	MW-17-CDM		MW-17-GEOSY		RPD	ABS
			12/20/2018		12/19/2018				12/27/2018		12/27/2018			
			MW-10-181220						MW-17					
m,p-Xylene	1	µg/L	0.5 U	1 U	NC	NC			0.56		2 U	NA	1.44	
Methyl acetate	1	µg/L	0.5 U	2 U	NC	NC			0.5 U		4 U	NC	NC	
Methyl tert-Butyl Ether	1	µg/L	0.5 U	1 U	NC	NC			0.5 U		2 U	NC	NC	
Methylcyclohexane	1	µg/L	0.62		0.67 J	NA	0.05		0.21 J		20 U	NA	19.8	
Methylene Chloride	1	µg/L	0.5 U	2.5 U	NC	NC			0.54		5 U	NA	4.46	
o-Xylene	1	µg/L	0.5 U	1 U	NC	NC			1.6		1.2 J	NA	0.4	
Styrene	1	µg/L	0.5 U	1 U	NC	NC			0.5 U		2 U	NC	NC	
Tetrachloroethene	1	µg/L	0.5 U	0.5 U	NC	NC			0.21 J		1 U	NA	0.79	
Toluene	1	µg/L	0.14 J	0.75 U	NA	0.61			0.99		1.1 J	NA	0.11	
trans-1,2-Dichloroethene	1	µg/L	0.5 U	0.75 U	NC	NC			0.59		0.65 J	NA	0.06	
trans-1,3-Dichloropropene	1	µg/L	0.5 U	0.5 U	NC	NC			0.5 U		1 U	NC	NC	
Trichloroethene	1	µg/L	0.5 U	0.5 U	NC	NC			0.5 U		1 U	NC	NC	
Trichlorofluoromethane	1	µg/L	0.5 U	2.5 U	NC	NC			0.5 U		5 U	NC	NC	
Vinyl Chloride	1	µg/L	0.5 U	0.2 U	NC	NC			0.5 U		0.5	NA	0	

Notes:

1. No sample pairs are outside of RPD or ABS
2. PRP's laboratory analyzed 1,4-dioxane as a volatile organic compound.

ABS = absolute difference

CRQL = contract required quantitation limit

NA = not applicable

NC = not calculable

RPD = relative percent difference

µg/L = microgram per liter

Data Validation Qualifiers

J = The analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample.

R = The sample results are unusable due to poor data quality; certain criteria were not met.

The analyte may or may not be present in the sample at the reported concentration.

U = The analyte was not detected at a level greater than or equal to the level of the sample CRQL.

UJ = The analyte was not detected; however, the reported CRQL is approximate and may be inaccurate or imprecise.

Table 4-1
Soil Samples Statistical Data Comparison Summary
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical	CAS No.	Number of Split Sample Pairs	Number of Split Sample Pairs with Detected Concentrations	p-value (threshold 0.05)	Conclusion
Metals					
Antimony	7440-36-0	9	8	0.010	Data were not comparable with PRP sample results generally higher than CDM Smith split sample results
Arsenic	7440-38-2	9	9	0.063	Comparable
Silver	7440-22-4	9	5	0.032	Data were not comparable with PRP sample results generally higher than CDM Smith split sample results
Sodium	7440-23-5	9	8	0.419	Comparable
Thallium	7440-28-0	9	0	NC	All data were not detected
Vanadium	7440-62-2	9	9	0.399	Comparable
Zinc	7440-66-6	9	9	0.608	Comparable
Polychlorinated Biphenyl					
Aroclor 1242	53469-21-9	9	0	NC	All data were not detected
Aroclor 1254	11097-69-1	9	6	0.005	Data were not comparable with PRP sample results generally higher than CDM Smith split sample results
Aroclor 1260	11096-82-5	9	7	0.517	Comparable
Semivolatile Organic Compound					
1,1'-Biphenyl	92-52-4	9	0	NC	All data were not detected
1,2,4,5-Tetrachlorobenzene	95-94-3	9	0	NC	All data were not detected
2-Methylnaphthalene	91-57-6	9	2	NC	Less than 4 detected sample pairs
Acenaphthene	83-32-9	9	4	0.456	Comparable
Acenaphthylene	208-96-8	9	1	NC	Less than 4 detected sample pairs
Anthracene	120-12-7	9	5	0.124	Comparable
Benzo(a)anthracene	56-55-3	9	8	0.019	Data were not comparable with PRP sample results generally higher than CDM Smith split sample results

Table 4-1
Soil Samples Statistical Data Comparison Summary
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical	CAS No.	Number of Split Sample Pairs	Number of Split Sample Pairs with Detected Concentrations	p-value (threshold 0.05)	Conclusion
Benzo(a)pyrene	50-32-8	9	9	0.017	Data were not comparable with PRP sample results generally higher than CDM Smith split sample results
Benzo(b)fluoranthene	205-99-2	9	9	0.024	Data were not comparable with PRP sample results generally higher than CDM Smith split sample results
Benzo(g,h,i)perylene	191-24-2	9	8	0.023	Data were not comparable with PRP sample results generally higher than CDM Smith split sample results
Benzo(k)fluoranthene	207-08-9	9	8	0.017	Data were not comparable with PRP sample results generally higher than CDM Smith split sample results
Bis(2-ethylhexyl)phthalate	117-81-7	9	5	0.193	Comparable
Carbazole	86-74-8	9	4	0.118	Comparable
Chrysene	218-01-9	9	8	0.024	Data were not comparable with PRP sample results generally higher than CDM Smith split sample results
Dibenzo(a,h)anthracene	53-70-3	9	4	0.108	Comparable
Dibenzofuran	132-64-9	9	3	NC	Less than 4 detected sample pairs
Diethylphthalate	84-66-2	9	0	NC	All data were not detected
Dimethylphthalate	131-11-3	9	0	NC	All data were not detected
Di-n-butylphthalate	84-74-2	9	2	NC	Less than 4 detected sample pairs
Di-n-octylphthalate	117-84-0	9	1	NC	Less than 4 detected sample pairs
Fluoranthene	206-44-0	9	7	0.020	Data were not comparable with PRP sample results generally higher than CDM Smith split sample results
Fluorene	86-73-7	9	5	0.318	Comparable
Indeno(1,2,3-cd)pyrene	193-39-5	9	7	0.009	Data were not comparable with PRP sample results generally higher than CDM Smith split sample results

Table 4-1
Soil Samples Statistical Data Comparison Summary
Pierson's Creek Site, Operable Unit 2
Newark, New Jersey

Chemical	CAS No.	Number of Split Sample Pairs	Number of Split Sample Pairs with Detected Concentrations	p-value (threshold 0.05)	Conclusion
Naphthalene	91-20-3	9	4	0.094	Comparable
Phenanthrene	85-01-8	9	8	0.088	Comparable
Phenol	108-95-2	9	2	NC	Less than 4 detected sample pairs
Pyrene	129-00-0	9	8	0.056	Comparable
Volatile Organic Compound					
1,2,3-Trichlorobenzene	87-61-6	8	0	NC	All data were not detected
1,2,4-Trichlorobenzene	120-82-1	8	1	NC	Less than 4 detected sample pairs
1,4-Dichlorobenzene	106-46-7	8	3	NC	Less than 4 detected sample pairs
2-Butanone	78-93-3	8	0	NC	All data were not detected
Acetone	67-64-1	8	2	NC	Less than 4 detected sample pairs
Benzene	71-43-2	8	3	NC	Less than 4 detected sample pairs
Carbon Disulfide	75-15-0	8	0	NC	All data were not detected
Chlorobenzene	108-90-7	8	4	0.067	Comparable
cis-1,2-Dichloroethene	156-59-2	8	1	NC	Less than 4 detected sample pairs
Cyclohexane	110-82-7	8	2	NC	Less than 4 detected sample pairs
Ethylbenzene	100-41-4	8	5	0.164	Comparable
Isopropylbenzene	98-82-8	8	5	0.218	Comparable
m,p-Xylene	179601-23-1	8	4	0.069	Comparable
Methyl acetate	79-20-9	8	0	NC	All data were not detected
Methylcyclohexane	108-87-2	8	1	NC	Less than 4 detected sample pairs
o-Xylene	95-47-6	8	5	0.033	Data were not comparable with PRP sample results generally higher than CDM Smith split sample results
Tetrachloroethene	127-18-4	8	1	NC	Less than 4 detected sample pairs
Toluene	108-88-3	8	1	NC	Less than 4 detected sample pairs
Trichloroethene	79-01-6	8	1	NC	Less than 4 detected sample pairs

NC = not calculated for chemicals when less than four sample pairs were detected

PRP = potential responsible party

p-value from Paired Prentice Wilcoxon test less than 0.05 are **bolded**.